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National Forest

Socioeconomics Report

Lower Joseph Creek Restoration Project

October 2014

Wallowa-Whitman National Forest,
Wallowa County, Oregon

Kristen Loughery, Economist, TEAMS Enterprise Unit

Eric White, Research Associate, Ecosystem Workforce Program, University of Oregon

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SUMMARY

- The Proposed Action and Alternative 3 Present Net Values are estimated to be negative (-$5.9 million and -$5.1 million, respectively).
- The Proposed Action is estimated to support 55 total jobs and $2.9 million in labor income annually, compared to Alternative 3, which is estimated to support 34 total jobs and $1.9 million in labor income annually.
- The Proposed Action alternative has a greater effect to access than Alternative 3.
- The positive effects to recreation uses for fishing, gathering special forest products, and hunting are greater in the long term under the Proposed Action Alternative since there will be more restoration treatments and a corresponding lower risk of wildfire.
- Overall, the Proposed Action is expected to improve non-market values to the greatest extent in the long term.

The Lower Joseph Creek Restoration Project (LJCRP) is primarily driven by mutual goals for ecosystem restoration and enhancement of the socioeconomic vitality of natural resource-dependent communities. The LJCRP proposes to implement multiple resource management actions as guided by the Wallowa-Whitman National Forest (WWNF) Forest Plan (1990) and other national level policy and guidance. Over the 10-year span of the project, the Forest Service proposes to implement activities across the approximate 100,000 acre LJCRP area to meet the purpose and need of the project.

The LJCRP has the potential to affect local economies. Ecosystems play an important role in the lives of people and economies. Use of resources, such as timber, generate employment and income in the surrounding communities and generate revenue that is returned to the Federal treasury or used to fund additional activities on the ground to accomplish land management objectives. Contracting to complete non-commercial restoration activities provide revenue for businesses and provides job opportunities. Ecosystems also provide opportunities for recreation, including hunting and fishing, and can be sources of goods, like firewood or mushrooms, important to local populations.

This document describes how people use and interact with resources on the WWNF and the economic consequences of the LJCRP. Issues raised during the public comment period and subsequent public meetings revealed that local communities are concerned about the socioeconomic effects of the LJCRP, which is addressed in this report. The initial discussion focuses on the social and economic affected environment and then the discussion addresses the consequences of a series of project activities related to the alternatives, including the financial efficiency, economic impacts. Financial efficiency relates to the costs and revenues of doing the action. Economic impacts relates to how the action affects employment and income in the surrounding area.

The socioeconomic analysis area includes Wallowa County and the Nez Perce Reservation in Idaho. While the restoration activities are proposed to occur in Wallowa County, there are anticipated effects in the Nez Perce Reservation since the residents heavily rely on subsistence uses in the LJCRP area and would therefore be expected to experience economic impacts from the LJCRP. For the economic impact analysis, the economic impact area is comprised of Wallowa and Union counties. Those counties have contractors that are expected to complete many of the restoration activities, have mills that can process

much of the commercial material produced from the project, and represent the functional local economy for people living and working around the project area.

The financial efficiency analysis used estimated costs and benefits of the timber harvest and restoration activities to develop Present Net Values (PNVs, revenue minus costs) of the alternatives. The economic impact analysis used treatment data to estimate effects of the project on jobs and labor income in the economic impact analysis area. The Proposed Action and Alternative 3 PNVs are estimated to be negative (-$5.9 million and -$5.1 million, respectively). In order to completely examine financial efficiency, all costs and benefits associated with the alternatives should be considered, which include costs and benefits that may not be quantified monetarily. Therefore, the financial efficiency measures presented here should not be viewed as a complete answer, but only alongside other social and ecological impacts. The Proposed Action is estimated to support 55 total jobs and $2.9 million in labor income annually, compared to Alternative 3, which is estimated to support 34 total jobs and $1.9 million in labor income annually.

While minority and low-income populations exist in the area, the alternatives are not expected to have disproportionately high and adverse human health or environmental effects on these communities. However, possible employment and labor income impacts of the Proposed Action and Alternative 3 could support employment and income in the area, which could benefit area minority and low-income populations.

In addition to effects on the local economy, activities under the LJCRP have the potential to affect social values in terms of the livelihood, cultural values, and biological values of people in the analysis area. The social consequences in this report focus on access to NFS lands, recreation uses, water quality, wildlife, and value for old growth trees, environmental justice, and non-market values. The Proposed Action alternative has more of an effect to access than Alternative 3. The positive effects to recreation uses for fishing, gathering special forest products, and hunting are greater in the long term under the Proposed Action Alternative since there will be more restoration treatments and a corresponding lower risk of wildfire. However, under the No Action alternative and Alternative 3, recreation effects could be greater as the risk of fire is expected to be greater without any or less restoration treatments.

The existence of non-market values likely underestimates the benefits of the LJCRP. Over time, forest restoration treatments would decrease fuel load and decrease potential smoke emissions from both planned and unplanned ignitions. The proposed activities would protect ecosystem services and other social values, such as recreation opportunities and subsistence uses. Overall, the Proposed Action is expected to improve non-market values to the greatest extent in the long term.

REGULATORY FRAMEWORK

Multiple statutes, regulations and executive orders identify the general requirement for the application of economic and social evaluation in support of Forest Service planning and decision making. These include, but are not limited to, the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215: 16 USC 528-531), National Environmental Policy Act of 1969 (83 Stat. 852; 42 USC 4321, 4331-4335, 4341-4347), and the Planning Act of 1974. In addition, the preparation of NEPA documents is guided by CEQ regulations for implementing NEPA [40 CFR 1500-1508]. NEPA requires that consequences to the

human environment be analyzed and disclosed. The extent to which these environmental factors are analyzed and discussed is related to the nature of public comments received during scoping. NEPA does not require a monetary benefit-cost analysis. If an agency prepares a financial efficiency analysis, then one must be prepared and displayed for all alternatives [40 CFR 1502.23].

Office of Management and Budget (OMB) Circular A-94 promotes efficient resource use through well-informed decision-making by the Federal government. It suggests agencies prepare an efficiency analysis as part of project decision-making. It prescribes present net value as the criterion for an efficiency analysis.

The development of timber sale programs and individual timber sales is guided by agency direction found in Forest Service Manual (FSM) 2430. Forest Service Handbook (FSH) 2409.18 guides the financial and, if applicable, financial efficiency analysis for timber sales. Forest Service Handbook (FSH) 2409.19, chapter 60 – Stewardship Contracting, provides direction for applying revenues generated from timber sales to achieve restoration and land management activities.

Many of the costs and benefits associated with a project are not quantifiable in financial terms. For example, the benefit to wildlife from habitat improvement from a project is not quantifiable in financial terms. These costs and benefits are described qualitatively in the indicated resource sections of this document. Title 40, Code of Federal Regulations for NEPA (40 CFR 1502.23) indicates:

> For the purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are qualitative considerations.

Executive Order 12898, issued in 1994 orders federal agencies to identify and address any adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. The Order also directs agencies to consider patterns of subsistence hunting and fishing when an agency action may affect fish or wildlife.

The Civil Rights Act of 1964 provides for nondiscrimination in voting, public accommodations, public facilities, public education, federally assisted programs, and equal employment opportunity. Title VI of the Act, Nondiscrimination in Federally Assisted Programs, as amended (42 U.S. C. 2000d through 2000d-6) prohibits discrimination based on race, color, or national origin.

ANALYSIS METHODOLOGY

Indicators used in this economic analysis include Present Net Value (PNV) in the financial efficiency analysis and jobs and labor income in the economic impact analysis. The inputs for the analysis, such as acres burned and timber harvested, were maximum values of treatment for each alternative, as projected by resource specialists. The financial efficiency analysis assumes the costs of treatment and revenue from harvest are anticipated maximum values. Because the costs are likely more variable due to greater uncertainty (more factors influencing total costs), the PNV analysis could overstate the costs.

Where applicable, values estimated in the Lower Joseph Creek Watershed Assessment were used in the development of treatment costs and economic impacts (NRAC 2014). The social analysis also considered values conveyed in the assessment to evaluate effects on the local communities.

Non-market values, such as the value of recreation experiences and ecosystem services, by their nature, are difficult to quantify. As noted above, direction provided in 40 CFR 1502.23 and Forest Service Handbook 1909.15, (7/6/04) and 22.35 (01/14/05) provides for the use of qualitative analysis to evaluate the effects of these non-market values. The non-market aspects of each proposed activity are described in other resource sections of the DEIS and specialist reports. Since proposed activities are anticipated to improve current resource conditions, these activities are highly likely to increase non-market values (benefits) associated with the natural resources within the LJCRP project area. Since these non-market benefits are not included in the PNV, the PNV is likely an underestimate.

Treatment Costs and Revenue

The estimates below in

	ANNUAL TREATMENT			
COST CATEGORY	**Alt 2**	**Alt 3**	**Price per unit**	**Units**
NON MECHANICAL				
Broadcast Burning (Planned Ignition Natural Fuels)	5,000	5,000	$ 90	acres
Pile Burning (Grapple Piles)	678	464	$ 70	acres
Pile Burning (TSI Hand Piles)	47	40	$ 70	acres
Timber Stand Improvement (Chainsaw) and Hand Pile [25% of TSI pole]	47	40	$ 400	acres
Timber Stand Improvement (Chainsaw) [TSI seed/sap]	356	102	$ 125	acres
Burn landings	1,639	1,006	$ 5	acres
MECHANICAL				
Grapple Pile (Activity Fuels on Tractor Ground)	678	464	$ 175	acres
Timber Stand Improvement (Tractor) [75% of TSIpole]	142	119	$ 200	acres
COMMERCIAL TIMBER HARVEST- REVENUE				
timber harvest	10,400	6,600	$ 23	ccf
COMMERCIAL TIMBER HARVEST- COSTS				
Weed spraying	56	56	$ 300	acres
Sale Preparation	10,400	6,600	$ 20	ccf
Sale Administration	1,639	1,006	$ 20	acres
Site Preparation [20% of GS Acres]	52	18	$ 120	acres
Planting [20% of GS Acres]	52	18	$ 350	acres
Regeneration Surveys	52	18	$ 6	acres
Plantation Survival Exams	52	18	$ 8	acres
ROADS				
Road Construction				
Temporary Road Construction	1.3	1.3	$ 15,000	mile
Specified Road Reconstruction	82.6	82.6	$40-70,000	mile
Active Road Decommissioning	1.5	0.0	$ 3,600	mile
Road Maintenance				
Road Surface Replacement Collections				
Asphalt Surface (8.7 miles)	2,600	1,650	$0.48	ccf/mile
Crushed Aggregate Surface (30.8 miles)	7,800	4,950	$0.47	ccf/mile
Purchaser/Contractor Performed Maintenance				
Operational Maintenance Level 1	10	7	$ 2,190	mile
Operational Maintenance Level 2	16	18	$ 1,721	mile
Operational Maintenance Level 3	4	4	$ 680	mile

Table 1 were developed by the specialists working with the WWNF. This data was used to develop the financial efficiency and economic impact analyses. The annual estimates below are expected to occur over a 10-year time period and are recognized as the maximum number of treatment acres and harvested timber volume. Not all of the costs are included in the economic impact analysis because if the activities are expected to be carried out by Forest Service staff, these costs were already analyzed in the Forest Plan (pile burning, sale preparation, and sale administration costs). The new impacts to local economies from the LJCRP project are the interest of this report, therefore the contracted costs are used to analyze economic impacts to employment and labor income. However, for the financial efficiency analysis, the only costs included in calculations were those costs that were not included in the stumpage rate to avoid double-counting (excludes burn landings, site preparation, planting, surveys, survival exams and all road

costs). The excluded costs for the financial efficiency analysis were included in the stumpage rate so it would be redundant to include them in the PNV analysis.

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Table 1. Treatment estimates and cost per alternative.

Financial Efficiency (PNV)

Financial efficiency is a comparison of the costs and benefits that can be quantified in terms of actual dollars spent or received in the analysis area over the life of the project. As the Forest Service Handbook 2409.18 indicates, this analysis provides a comparison of anticipated costs and revenues that are part of Forest Service monetary transactions. Given the information provided, financial efficiency measures are calculated in this analysis to provide a means of comparing the financial efficiency of alternatives. This

analysis offers a consistent measure for comparison of alternatives, however, it should not be viewed as a complete answer, but as only an examination of trade-offs between costs and benefits. The financial efficiency measures discussed below, along with social, ecological or other non-market values discussed throughout the document, provide a complete comparison of the alternatives.

The alternatives are compared using a financial efficiency measure called Present Net Value (PNV). The foundation behind the PNV calculations is the "Time Value of Money Principle," which states that money received now is worth more than some amount received in the future. The money received now could be put to some advantageous use or interest can accrue until the future date. A 4-percent discount rate is commonly used for evaluations of long-term investments and operations in land and resource management by the Forest Service (FSM 1971.21). This discount rate is used in the calculation of PNV.

According to OMB Circular A-94, PNV is the standard criterion for deciding whether a project is economically justifiable. PNV is a way of comparing all monetarily valued costs and benefits, and is calculated by subtracting the discounted sum of costs from the discounted sum of benefits. A positive PNV suggests the discounted sum of benefits is greater than the discounted sum of costs, and a negative PNV suggests the opposite.

Management of the Forest is expected to yield positive benefits, but not necessarily financial benefits. Costs for proposed restoration activities were estimated based on recent observed costs from other projects on the WWNF and surrounding forests (e.g. prescribed burning, understory thinning and timber sales) and professional estimates provided by LJCRP resource specialists. These estimates were provided to the project economist and used to inform the PNV model.

The financial efficiency analysis is specific to the timber harvest and ecosystem management associated with the project (as directed in Forest Service Manual 2400–Timber Management and guidance found in the Forest Service Handbook 2409.18). Costs that were not included in the stumpage rate, such as sale preparation, sale administration, and broadcast burning are included in the PNV calculations. The road implementation costs are built into the stumpage rate so including them in the PNV analysis would be redundant. All costs, timing, and amounts were developed by the specialists on the project's interdisciplinary team.

The stumpage rate was calculated as a weighted average based on species composition of the removed sawlogs and pulp and was estimated to be $23 per hundred cubic feet (ccf). The stumpage rate estimate is based on previous appraisals for ground-based logging systems. However, if the Lower Joseph timber harvest were to include skyline and/or helicopter logging, the harvest costs would increase and therefore the stumpage rate would decrease. According to specialists on the Forest, skyline logging is about 55 to 60 percent higher than ground-based logging costs and helicopter logging usually costs 3-4 times that of ground-based logging. For both of these cases, the stumpage values would likely be negative, meaning that the FS is paying to have the timber harvested rather than collecting revenue. The stumpage rate was used to calculate revenue to the Forest Service from the timber harvest per alternative. The expected revenue is the stumpage rate multiplied by the volume of timber harvested. The actual timber value will depend on the market when the timber is sold and may be higher or lower than the stumpage rate used.

This analysis is not intended to be a comprehensive benefit-cost or PNV analysis that incorporates a monetary expression of all known market and non-market benefits and costs that is generally used when financial efficiency is the sole or primary criterion upon which a decision is made. Many of the values

and costs associated with natural resource management are best handled apart from, but in conjunction with, a more limited benefit-cost framework. Therefore, they are not described in financial or economic terms for this project, but rather are discussed in the various resource sections of the DEIS and other specialist reports; for example effects on wildlife and restoration of watersheds and vegetation. When evaluating trade-offs, the use of efficiency measures is one factor of many used by the decision maker in making the decision.

Economic Impacts

Economic impacts were modeled using IMPLAN Professional Version 3.0 with 2012 data and the Forest Service planning tool FEAST, version 6.30.14. IMPLAN is an input-output model, which estimates the economic impacts of projects, programs, policies, and economic changes on a region. FEAST is a custom spreadsheet tool that uses IMPLAN output to relate management activities to expected economic effects. The version of FEAST used in this analysis includes a calculator to estimate how much labor is needed to harvest and process commercial timber sales of different volumes. Those calculations were developed from a study of forest sector businesses in Oregon and Washington (Sorenson et al. 2014).

IMPLAN analyzes the direct, indirect, and induced economic impacts. Direct economic effects are generated by the activity itself, such as the work required to complete restoration treatments and to process commercial material harvested from the treatments. Indirect employment and labor income effects occur when a business or contractor purchases supplies and services (such as tires, fuel, equipment, accounting services, etc.) from other industries. Induced effects are the employment and labor income generated from the spending of new household income generated by direct and indirect employment. In the economic impact tables, direct, indirect, and induced contributions are included in the estimated impacts. The IMPLAN model we use in this analysis describes the economy in 440 sectors using Federal data from 2012.

Much attention is given to effects of Forest Service management on private employment. The employment estimates reported here are part-time, seasonal, or full-time jobs reported on an annualized basis. That is, in this analysis, 1 job could represent a full time job lasting all year, a part-time job lasting all year, two part-time jobs lasting 6 months each, four full time jobs lasting 3 months each, or some other combination that amounts to one year of employment.

Data on resource production and treatment levels under each alternative were collected from Forest Service resource specialists. In most instances, the precise production volumes and treatment amounts are unknown. Therefore, the changes are based on the professional expertise of the resource specialists. Future economic impacts are estimated based on the assumption of full implementation of each alternative. The actual changes in the economy would depend on individuals taking advantage of the resource-related opportunities that would be supported by each alternative. If market conditions or trends in resource use were not conducive to developing some opportunities, the economic impact would be different from what is estimated in this analysis. We assume the restoration treatments and the production of commercial timber volume will occur over 10 years. We report average annual economic effects assuming one-tenth of the total acres and volume is produced each year over that period. If the project was completed over a shorter timeframe, the economic effects in some years would likely be higher than the average effects reported here.

In this analysis, we consider the effects to the economy from contracted work to complete non-mechanical precommercial restoration treatments, mechanical precommercial restoration treatments, restoration treatments that produce commercial timber volume, road construction, and road maintenance. We also consider the economic effects from processing commercial timber within the economic impact area. We examined restoration-treatment contracting on the WWNF from 2004 to 2013 to identify what percentages of contracted work of different types were awarded to contractors located in counties containing the WWNF. We used those figures to estimate the dollar share of contracted work that would go to contractors located within the economic impact area; the remainder is assumed to go to contractors located outside the economic impact area. We assume that 100 percent of the commercial timber harvest will be completed by contractors in Wallowa and Union counties.

ACTIVITY	**Assumed share of contract value to be received by contractors in Wallowa and Union Counties**
NON MECHANICAL	
Broadcast Burning (Planned Ignition Natural Fuels)[a]	22%
Timber Stand Improvement (Chainsaw) and Hand Pile [25% of TSIpole]	22%
Timber Stand Improvement (Chainsaw) [TSI seed/sap]	22%
MECHANICAL	
Grapple Pile (Activity Fuels on Tractor Ground)	44%
Timber Stand Improvement (Tractor) [75% of TSIpole]	44%
COMMERCIAL TIMBER HARVEST	
Restoration treatment with generation of commercial products	100%
Weed spraying	43%
Site Preparation [20% of GS Acres]	43%
Planting [20% of GS Acres]	43%
Regeneration Surveys	43%
Plantation Survival Exams	43%
ROAD CONSTRUCTION	54%
ROAD MAINTENANCE	54%
[a] We assume that 25% of project broadcast burning is completed by private contractors.	

Table 2 Contracted activities and value contracted in the economic impact area.

Based on specialist's estimates, we assume that 75% of the commercial product volume will be sawtimber; the remainder pulpwood. Twenty-five percent of the sawtimber volume is projected to be ponderosa pine and we project that 75% of the sawtimber volume of that species will be sent outside the economic impact area for processing. All of the remaining sawtimber volume is projected to be processed by sawmill and plywood processing facilities in the economic impact area. We assume that 50% of the pulpwood volume will be at least initially processed in the economic impact area: processed into chips before being shipped out of the area for further use, processed into post and poles, or processed into firewood. The remaining pulpwood is assumed to leave the economic impact area unprocessed.

Social Impacts

The social analysis for the LJCRP attempts to explain the values, beliefs, and attitudes of the local communities with anticipated effects from the LJCRP. The public meetings that were held in Enterprise, OR as well as the submitted written comments provided insight into the values, beliefs, and attitudes of the Lower Joseph Creek area residents and surrounding communities. Although all of the values, beliefs and attitudes are not captured in this analysis, the information received through public comments is the best data available.

Values are "relatively general, yet enduring, conceptions of what is good or bad, right or wrong, desirable or undesirable."

Beliefs are "judgments about what is true or false – judgments about what attributes are linked to a given object. Beliefs can also link actions to effects."

Attitudes are "tendencies to react favorably or unfavorably to a situation, individual, object, or concept. They arise in part from a person's values and beliefs regarding the attitude object" (Allen et al 2009).

Social impacts use the baseline social conditions presented in the **Error! Reference source not found.** section to discern the primary values that the Forest provides to area residents and visitors. Social effects are based on the interaction of the identified values with estimated changes to resource availability and uses. Indicators used in the social analysis to measure changes between alternatives in the planning area are displayed below in Table 3. Environmental justice and non-market values are also addressed.

Issue	**Indicator**
Access	Miles of decommissioned and closed roads
Recreational fishing opportunities	Effects to fish habitat (see also Aquatics report)
Recreational hunting opportunities	Effects to wildlife habitat (see also Wildlife report)
Recreation opportunities for gathering forest products	Effects to habitat for plants (see also Botany report)

Table 3. Social Indicators.

AFFECTED ENVIRONMENT

Certain defining features of every area influence and shape the nature of local economic and social activity. Among these are population characteristics, types of longstanding industries such as forestry, area racial and cultural characteristics, and unique area amenities. Population, employment and income changes may be related to natural amenities (Mueser 1995, Lewis 2002) often provided by public lands. The WWNF operates as a steward of many of these natural amenities and consequently supports a portion

of area population and employment growth and thus plays a principal role in the community. This discussion gives further insight on the character and extent of these community connections.

Analysis Area

The WWNF falls mostly in the northeast corner of Oregon and also has parts in the west central edge of Idaho and southwest Washington. The WWNF lies within Wallowa, Union, Baker, Malheur, Umatilla, and Grant Counties in Oregon; Adams, Idaho, and Nez Perce Counties in Idaho; and Asotin County in Washington. The LJCRP is on the Wallowa Valley Ranger District on the northern boundary of the WWNF, approximately 15 miles north of Enterprise, Wallowa County in the Upper and Lower Joseph Creek watersheds.

Wallowa and Union counties comprise the economic analysis area for the economic impact analysis. Together, the two counties contain many of the businesses that will likely complete the contracted restoration work, the facilities that will process much of the commercial timber material removed, and represent the functional economy for many of the individuals residing and working in the area.

The social analysis area (used throughout the Affected Environment section and social effects) was chosen based on the area with likely social impacts from this project, which includes Wallowa County and the Nez Perce Reservation, as discussed below. The majority of comments were from Wallowa County and the expected social effects on communities from the LJCRP are anticipated to occur in this area. However, IMPLAN data does not include the Nez Perce Reservation so this social analysis area was included only where data was available.

It is important to capture the Nez Perce communities in the social analysis area (Nez Perce people call themselves Nimi'ipuu) since they are expected to be impacted by the LJCRP. The Nez Perce Reservation lies in Nez Perce, Lewis, Clearwater and Idaho counties in Idaho. The LJCRP is located entirely within the Nez Perce tribe's aboriginal territory subject to the rights the Tribe reserved and the United States secured in the Treaty of 1855. The Project is also located within the Tribe's area of exclusive use and occupancy as adjudicated by the Indian Claims Commission. Wallowa County and the Nez Perce Reservation were included in the social analysis area because impacts on the Nez Perce communities that reside in Wallowa County and/or use the WWNF resources would presumably impact Nez Perce Reservation residents. The LJCRP will impact the communities on the Reservation through their traditional and subsistence cultures if the members travel for resources on the WWNF land. Historically, "the Nimi'ipuu traveled across Oregon, Washington, and Idaho. The traditional homeland of the NiMiiPuu is North Central Idaho, including areas in Southeastern Washington, Northeastern Oregon with usual and accustomed areas in Western Montana and Wyoming" (Nez Perce Tribe 2010). See the Heritage and Tribal Relations report for more details on the use of the LJCRP area by the Nez Perce tribe.

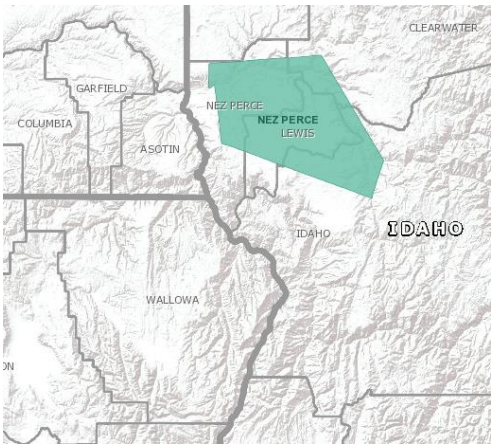

Figure 1. Map of Nez Perce Reservation (U.S. Department of Commerce 2013b)

Existing Conditions

Population and Demographic Change

From 2000 to 2012, the population of Wallowa County declined from 7,226 to 6,938, a 4 percent decrease. The population of the Nez Perce Reservation grew from 17,959 to 18,658, a 4 percent increase. The growth seen in the analysis area was much lower than the national growth rate (9.8 percent) (U.S. Department of Commerce 2013). However, it is important to note that, as estimated by the American Community Survey as of 2012, only 10.6 percent of the total population in the Nez Perce Reservation classified themselves as American Indian alone (1,982 people) (U.S. Department of Commerce 2013). "As of November 2004, the enrollment for the Nez Perce Tribe was 3,363" (Nez Perce Tribe 2010). Either differences in data generation or a significant reduction in the Nez Perce Tribe population could explain this decline from 2004 to 2012.

The median age is a good indicator of the age structure of the population. From 2000 to 2012, the median age of Wallowa County increased from 44.4 to 50.8 years. From 2000 to 2012, the median age of the Nez Perce Reservation increased from 40.8 to 45.7 years. The median age in the U.S. in 2012 was 37.2 (U.S. Department of Commerce 2013). This increasing trend in median age could illustrate that young people are either not staying in the communities or people are having less children. As the communities are aging, consideration should be given to their specific needs. For example, recreation access could rely on special parking needs or walkways. Demand for access may also change with age as people may need more paved access routes for vehicles.

Employment

Employment within Wallowa County is distributed amongst industry sectors and displayed below in Figure 3 (IMPLAN 2012). Agriculture, Forestry, Fishing & Hunting; Government; and Retail Trade sectors contain the largest shares of employment in Wallowa County. In addition, Logging sector jobs make up 2 percent of total employment in Wallowa County. Management of the LJCRP could affect the employment in these sectors so it is important to consider how the employment is distributed.

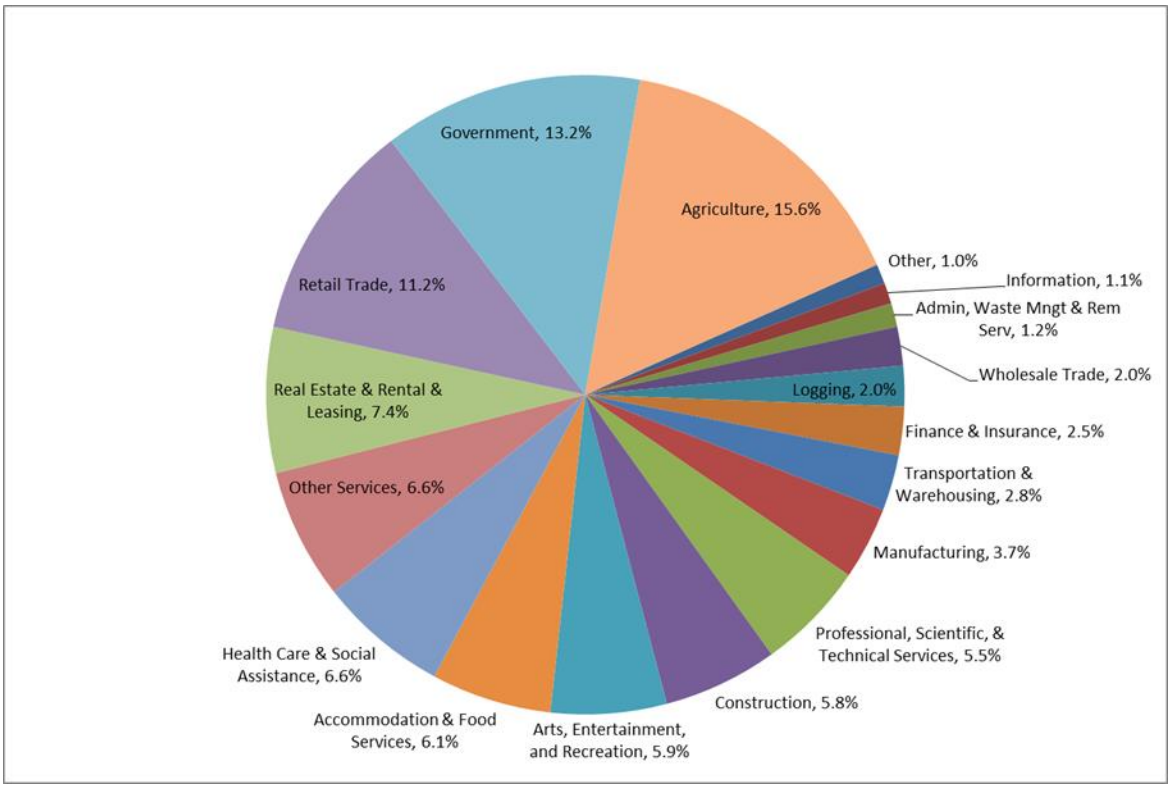

Figure 2. Employment in Wallowa County (IMPLAN 2012)

Identification of employment specialization for the analysis area provides a frame of reference for effects from changes in management from the LJCRP project. Specialization is examined by comparing the share of employment in each industry in the region of interest (only Wallowa County since IMPLAN data is not available for the Nez Perce Reservation) to the share of employment in each industry for a larger reference region (the state of Oregon). For a given industry, when the percent employment in the analysis region is greater than in the reference region, local employment specialization exists in that industry (Forest Service 1998). Of particular interest is where specialization occurs within industries related to LJCRP management covered under this project, specifically forest products. The timber sector includes logging and forest product manufacturing (sawmills, post and pole manufacturing, etc.). It should be noted that the contributions from the LJCRP represent only a portion of the economic activity reflected in industry sectors seen in **Error! Reference source not found.**.

Using this criterion applied with 2012 data, the analysis area can be characterized as most specialized in the Agriculture, Forestry, Fishing & Hunting; Arts, Entertainment, and Recreation; and Real Estate & Rental & Leasing sectors (shares of total employment in these sectors are, respectively, 11.9, 3.5, and 2.7 percentage points greater than shares in the state). Wallowa County can also be considered slightly specialized with respect to the Logging sector since the percent of total employment in the analysis area is 1.7 percentage points greater than in the state of Oregon (IMPLAN 2012).

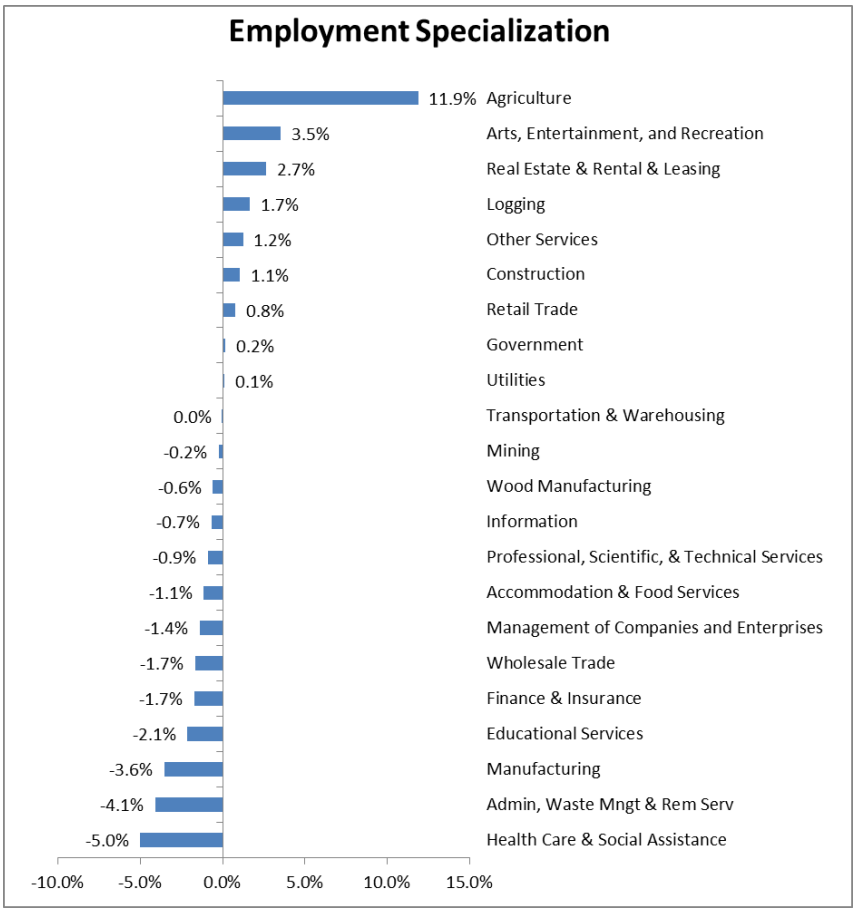

Figure 3. Employment Specialization in Wallowa County, OR (IMPLAN 2012)

Income

Per capita personal income (PCPI) is a useful measure of economic well-being. In 2012, per capita income (total personal income divided by the total population in the area) in Wallowa County was $22,524 and in the Nez Perce Reservation was $20,049. This is much lower than the per capita income for the U.S., $28,051 (U.S. Department of Commerce 2013). PCPI includes income from 401(k) plans as well as other non-labor income sources like transfer payments, dividends, and rent. Since PCPI is average income per person, it is important to consider that there is a proportion of people in the analysis area that are not employed and therefore bring the average income down.

While PCPI is a useful measure of economic well-being, it should be examined alongside changes in real earnings per job. In 2012, the average wage per job (employee compensation plus proprietor income divided by total number of jobs) in Wallowa County was $25,232, which was significantly lower than the average wage per job in Oregon ($48,800). Since Wallowa County has such a high percent of employment in the Agriculture sector (15.6 percent) and the average wage per job in this sector is $19,628, it makes sense that the average wage per job is lower in Wallowa County than in the state of Oregon. Although the Logging sector only contains about 2 percent of total jobs in Wallowa County, this sector contains 6.5 percent of total labor income because the average wage per job in the logging sector was $62,000 in 2012.

As explained above, specialization in certain industries provides a frame of reference for effects from changes in management from the LJCRP project. Labor income specialization is a useful indicator of industries that generate greater labor income in the analysis area compared to the state, and are therefore specialized. Using the specialization criterion, as discussed under the Employment section above, applied with 2012 data, Wallowa County can be characterized as most specialized in the Government; Agriculture, Forestry, Fishing & Hunting; and Logging sectors (shares of total labor income in these sectors are, respectively, 10, 6.2 and 4.4 percent greater than shares in the state) (IMPLAN 2012).

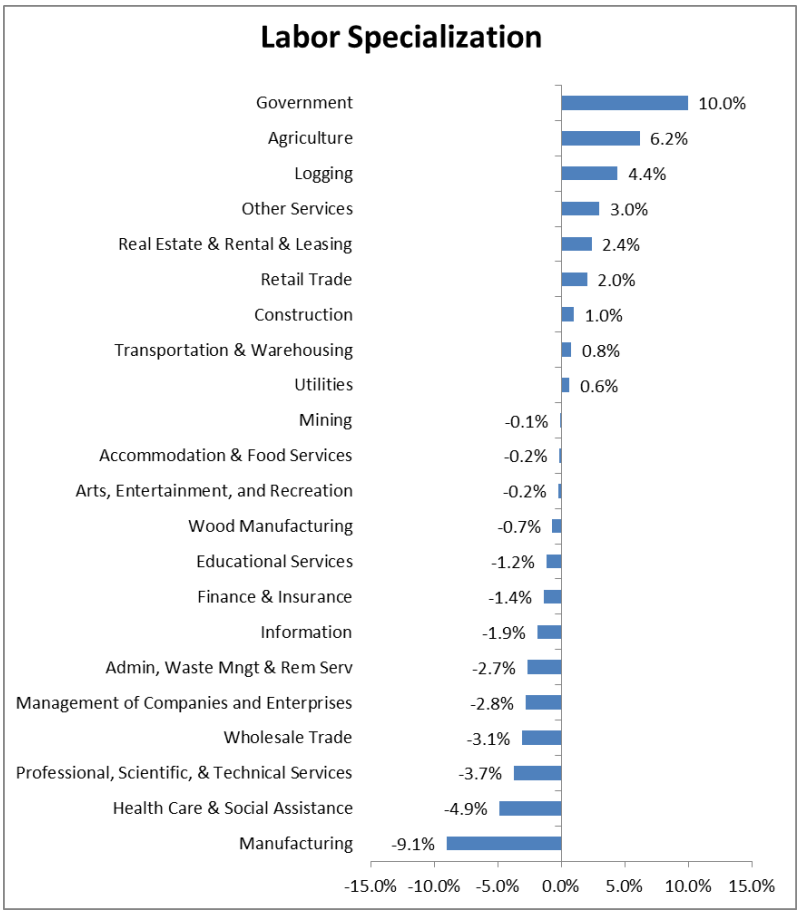

Figure 4. Labor Income Specialization in Wallowa County, OR (IMPLAN 2012)

Values, Beliefs, and Attitudes

The public meetings that were held in Enterprise, OR as well as the submitted written comments provided insight into the values, beliefs, and attitudes of the Lower Joseph Creek area residents and surrounding communities. Although not all of the values, beliefs, and attitudes are captured in this analysis, the information received through public comments is the best data available. The major concerns from the commenters were focused on economic, cultural and biological values, with specific beliefs regarding roads and access, vegetation treatments, cultural and tribal resources, and recreation, among others.

Livelihood

The economic values expressed through the meetings and public comment period referenced concern about roads and access, maximizing the value of timber, and efficiency of the restoration project. The commenters with these concerns seem to value the Forest resources as they contribute to local economies and believe these resources should be used to create jobs and income. Forest health is something many commenters value as it supports timber harvest for local economies. Healthy forests help mitigate the risk of wildfire, pests, and invasive species and therefore can improve harvest conditions. From these commenters, attitudes are positive regarding logging, grazing and gathering of forest products, such as firewood.

Through consultation with resource groups and other members of the public, it is clear that some people in the communities within the LJCRP area highly value access to public lands for economic and cultural reasons. Many commenters revealed that they value roads for the access they provide for logging, recreation (including plant and mushroom gathering and access for the disabled), firewood gathering, forage availability, and protection from fire. In addition, this group of commenters believe access to FS land has continually been limited over the past 20 years through various restoration projects, Forest Plan amendments, and the WWNF Travel Management Plan. The general attitude is that roads need to remain open and in good condition for these resources to be accessed and to support the local communities.

In addition to the value of access to public land, people also expressed their high value of the economic livelihood that commercial timber harvest from the WWNF supports. Some commenters believe that economic well-being in the region is contingent upon jobs created and tax revenue from timber sales. Commenters also illustrated their value for a diverse community age structure since currently, the youth are leaving the area for jobs elsewhere and the median age is increasing. The "departure [of youth] disrupts some of the continuity within the community, and the departure of younger families erodes civic capacity. The community is experiencing a real shortage of volunteers, especially to lead youth activities" (Christoffersen 2005). Therefore, the attitudes of the logging industry and people affected by the industry are generally positive towards timber harvest.

Public meetings also revealed that people value quality education and other public services (also noted in Christoffersen 2005). The American Forest Resource Council (Appendix D 2014) reported that from 2003 to 2013, K-12 school enrollment in Wallowa County declined by 7.8 percent and from 1997 to 2013 enrollment declined by 39 percent. With Forest Service projects, such as the LJCRP, people believe that the increase in the timber supply increases local jobs and the tax base, reduces the risk of fire, and increases forage for grazing. In addition to increases in jobs for loggers, truck drivers, maintenance workers, and other support workers will benefit from increased opportunities. They believe that the timber industry has the potential to bring back jobs for younger generations, which will support the retiring populations. However, the commenters noted that the harvest must be sustained and predictable for the long-term to have withstanding effects in their community.

Other people commented that the value of timber should be maximized and they believe this may entail the harvest of large trees. While not necessary to log large trees, the underlying belief is to maintain "product that pays for project." In other words, some commenters believe that the revenue collected from harvest should pay for the restoration project and depending on the restoration costs, more valuable trees may need to be harvested.

Cultural Values

Cultural values are also important to consider in the LJCRP area to understand how people have historically and presently use and care for the land and how it has played a role in their lives. People commented that the area proposed for management contains many cultural resources that are used to sustain and represent a way of life. Specifically, values of the land were revealed for recreation uses, such as hunting, firewood gathering, berry and mushroom picking, fishing and wildlife viewing. Not only are these activities valued economically, but commenters conveyed that these activities hold cultural values that they believe play an important role in their culture. In addition, a few commenters noted that visual quality objectives are important, which they were concerned could be reduced by the restoration efforts.

There were multiple comments from members of the Nez Perce tribe that expressed their cultural and religious values of the land and resources. They referenced the importance and values of tribal resources, such as fishing, native plants, wildlife, and biologically rich and resilient ecosystems. There were also comments expressing the belief that historic properties of religious and cultural significance should be protected. The comments on behalf of the Nez Perce members show the high cultural value of the land and belief that these lands are sacred, which creates wary attitudes towards intensive restoration efforts. See the Heritage and Tribal Relations report for more details on tribal values associated with place and use of forest resources by the Nez Perce tribe.

Biological Values

Biological values expressed through the comment period and public meetings range from concerns for conservation to air and water quality. Forest resources hold biological values for ecosystems and a significant amount of commenters expressed these values. In contrast to the commenters that value roads for the economic reasons as stated above, some commenters expressed values for water quality, concerns about erosion and loss of habitat connectivity, and wildlife habitat., which they feel will be negatively affected by roads. A substantial amount of comments were centered on the value for old growth and large diameter trees. Their attitudes toward the harvest of large trees were very negative. They believe that large trees are rare and should be protected, old trees provide carbon storage, habitat for plants and animals, and generally that “large trees are ecologically valuable.”

Additional comments revealed values for air and water quality. Commenters believe that smoke could negatively impact air quality and that the carbon emissions from prescribed burning could impact climate change. Another biological value illustrated through the comments was fish habitat in the Lower Joseph Creek and the belief that aquatic restoration is important. One commenter believes that there should be “no logging within 500 feet of the stream” in order to preserve the value and benefits provided by the stream. Of the biological concerns, a general belief was “restoring natural disturbance regimes and processes is key to restoring ecosystem functionality.” Since biological concerns are all related within the ecosystem functionality, a broad management strategy to address the ecosystems as a whole is important to the affected communities.

In addition, community members value healthy ecosystems that further support timber harvest and the economic values stated above. Many commenters believe that timber harvests improve the health of the forest and therefore improve air quality and water quality. For more details on the current biological conditions, see the Aquatics, Botany and Wildlife reports.

Timber Market and Forest Products

Prescribed burning and resiliency treatments allow for the controlled use of fire to manage forest density and health. Wildfire events, however, are unplanned and have the potential to cause loss of some values. Wildfires can be a substantial shock to timber markets. Following a wildfire, some of the killed timber is salvaged and brought to market. This can temporarily decrease the price of timber. While processing capacity is generally too low to lead to a substantial price shock, the price of timber may increase over the long-run due to the overall reduction in timber inventories from wildfire (Mercer 2000).

In general, the market for timber in the Western U.S. is experiencing a prolonged downturn from the decline in the U.S. housing market after the recession in 2008, which has caused the wood product prices and production to drop. "Capacity utilization at sawmills and other timber-using facilities in the West fell from over 80 percent in 2005 to just over 50 percent in 2009 and 2010" (Keegan et al. 2011). At the same time as wood market conditions have been changing, the quantity of timber supplied by the WWNF has declined over the past 20-25 years. The timber harvest on the WWNF peaked around 1990 with cut volume of about 250,000 MBF and a cut value of about $29 million (2013 dollars). In 2013, the cut volume was about 21,000 MBF with a value of $300,000 (Headwaters Economics 2014). Concurrent with a decline in public timber harvest, several mills have closed and remaining mills are operating below full capacity. With closure of mills and a contraction in the forest sector, jobs and income from the timber industry have also declined.

According to contacts in the Lower Joseph regional timber industry and the AFRC (2014) report, there are currently ten existing primary sawlog-consuming conifer mills in the region (in Grant, Umatilla, and Union counties, one in Washington state and one in Idaho that are considered part of the region). There are no longer any sawlog mills in Wallowa County. There is a mill in Wallowa County that produces non-sawlog products such as posts and poles, firewood, clean chips, and shavings. In addition, there are four primary pulplog-consuming conifer mills that are reliant upon the regional primary sawlog-consuming mills (AFRC 2014). Declining national forest timber supply is cited as a reason for closure of 15 mills in the region (AFRC 2014). Three of the closed mills were located in Wallowa County. Of the present ten primary mills, most are operating below full capacity (AFRC 2014, Appendix A).

The public meetings and the AFRC (2014) report revealed that the timber industry relies on a steady supply of timber from National Forest land. Infrastructure of the region's forest sector includes "all the facilities, businesses, and skilled labor employed to protect, grow, harvest, manufacture, and distribute commercial forest products derived from the 3.607 million acres of Blue Mountains forestlands available for timber management" (AFRC 2014). The economic viability and sustainability of the remaining mills is closely tied to the level of National Forest timber harvest.

Another concern of the timber industry in the LJCRP area is the sourcing of timber for processing. A portion of the regional timber industry currently sources their wood supply from long distances (up to a couple hundred miles from places such as Washington and southeastern Oregon). "When purchasing primary mills are too distant from the forest, the delivered-log costs are higher for the mill" (AFRC 2014).

As jobs and income in the analysis area's timber industry have declined over the last 20-25 years, some commenters noted that some of the jobs have shifted into the tourism industry with an emphasis on

recreation. “Overall economic changes in the community have included the emergence of the art sector, particularly bronze casting, as a strong economic force, growth in the tourism industry, and an increase in the proportion of county income composed of transfer payments” (NRAC 2014). However, they noted the perception that these are service-related jobs and often have lower wages.

Non-Market Values

The value of resource goods traded in a market can be obtained from information on the quantity sold and market price; however, markets do not exist for some resources, such as recreation opportunities and environmental services. Measuring their value is important, since without estimates, these resources may be implicitly undervalued and decisions regarding their use may not accurately reflect their true value to society. Because these recreational and environmental values are not traded in markets, they can be characterized as non-market values.

Non-market values can be broken down into two categories, use and non-use values. The use-value of a non-market good is the value to society from the direct use of the asset; within the WWNF this occurs through recreational activities such as hunting, wildlife viewing and OHV use. The use of non-market goods often requires consumption of associated market goods, such as lodging, food, and gas.

Non-use, or passive use, values of a non-market good reflect the value of an asset beyond its current use. These can be described as existence, option and bequest values. Existence values are the amount society is willing to pay to guarantee that an asset simply exists. Existence values for the WWNF might be the value of old growth trees, knowing that undisturbed native plant habitat exists, and the value associated with undeveloped scenic landscapes. In addition to implicit existence values, society's willingness to pay to preserve resources for future use contributes additional passive use values. The potential benefits people would receive from future use are referred to as option values when future use is expected to occur within the same generation and bequest values when preservation allows future generations to benefit from resource use. Within the LJCRP area, bequest and option values might exist for numerous plant species, ecosystems, undeveloped scenic landscapes, wild and scenic rivers, heritage sites, and recreational trails. Rosenberger and others (2012) found that “non-use benefits are more than three-and-a-half times greater than recreation-use benefits.” This is important to consider since these non-use values are difficult to quantify and are therefore excluded from the quantitative analysis presented below.

Many ecosystem services are also non-market values. Wildfire has the potential to reduce ecosystem service values through: (1) destruction of wildlife habitat, (2) water quality and watershed impacts, (3) damage to cultural and archaeological sites, and (4) soil erosion and impacts to water quality (Morton et al 2003). In contrast, forest restoration has the potential to improve ecosystem services. Expected ecosystem service benefits from LJCRP treatment include:

- Reduction of unnaturally large wildfires
- Protection of watersheds, leading to increases in surface water and decreases in soil loss
- Diversification of understory composition and protection of rare habitat from fire
- Better management of wildlife habitat
- Enhanced recreation that is aesthetically pleasing (Combrink et al 2012).

The LJCRP proposes to move towards more desired, healthy forest conditions. Forests in the less desirable conditions can have multiple effects on non-market values. For example, the presence of fuels

and homogeneity of the trees can impact the aesthetic values people derive from visiting the forest. When viewsheds are impaired and the healthy forest necessary for certain game species is not available, visits for wildlife viewing and hunting may decline (Rosenberger et al. 2012).

While use and non-use values exist in the LJCRP analysis area, valuation is not always feasible during the planning process; however, this does not preclude their consideration. Other public involvement efforts for projects in the area indicate that non-market values exist for recreation opportunities, land uses of traditional and cultural importance, and natural amenities managed by the WWNF. There is also value associated with restoration treatments, such as long-term supply of ecosystem services (e.g. water quality, air quality, and biodiversity). However, the analysis presented below will likely underestimate the benefits of restoration treatments under the LJCRP activities.

Environmental Justice

Environmental justice refers to the fair treatment and meaningful involvement of people of all races, cultures and incomes with respect to the development, implementation and enforcement of environmental laws, regulations, programs, and policies. Executive Order 12898 requires Federal agencies to "identify and address the… disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

According to the Council on Environmental Quality's (CEQ) Environmental Justice Guidelines for NEPA (1997) "minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis." The discussion below shows that the share of several minority populations exceeded the U.S. shares in 2012. Thus, the U.S. Census American Community Survey data suggest minority populations in the analysis area meet the CEQ's Environmental Justice criterion (U.S. Department of Commerce 2013).

CEQ guidance on identifying low-income populations states "agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect." As seen in Figure 5 below, Wallowa County has a higher percent of families below the poverty level than the U.S. and the Nez Perce Reservation has higher percent of people and families below the poverty level than the U.S. Therefore, the analysis area meets the CEQ's Environmental Justice criterion for low-income populations.

The emphasis of environmental justice is on health effects and/or the benefits of a healthy environment. The CEQ has interpreted health effects with a broad definition: "Such effects may include ecological, cultural, human health, economic or social impacts on minority communities, low-income communities or Indian Tribes …when those impacts are interrelated to impacts on the natural or physical environment" (CEQ 1997).

Race and Ethnicity

The analysis area population is predominately white and significantly less diverse than the general U.S. population. However, Table 4 indicates that the Nez Perce Reservation's share of American Indian

population exceeded the share in the country, 10.6 percent (U.S. Department of Commerce 2013). This estimate could be an underestimate of the actual American Indian population in the area due to underreporting. Of the total population in the Nez Perce Reservation as of 2012 (18,658), only 2,648 reported that they were American Indian or Alaska Native alone or in combination with one or more other races (14.2 percent of the total population in the Nez Perce Reservation) (U.S. Department of Commerce 2013).

As noted in the Values, Beliefs, and Attitudes section above, with a relatively high population of people that identify themselves as American Indian in the analysis area, it is important to consider their values, beliefs and attitudes when managing public lands. This information on race and ethnicity illustrates that there is a possibility that management actions may have disproportionately high and adverse effects on tribes. See the Heritage and Tribal Relations report for more details on the tribal population.

Location	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Two Or More Races	Hispanic or Latino Origin
United States	63.7%	12.2%	0.7%	4.8%	0.2%	0.2%	2.0%	16.4%
Wallowa County	94.5%	0.5%	0.6%	0.2%	0.1%	0.1%	1.7%	2.3%
Nez Perce Reservation	81.4%	0.2%	10.6%	0.5%	0.1%	0%	3.5%	3.7%

Table 4. Racial and Hispanic composition of 2012 population in the analysis area (U.S. Department of Commerce 2013)

Poverty

Poverty is an important indicator of both economic and social well-being. Individuals with low incomes are more vulnerable to a number of hardships which may negatively affect their health, cognitive development, emotional well-being, school achievement and promote socially unacceptable behavior (Hopson 2011). In general, low income individuals tend to rely more heavily on natural resources and depend more directly on national forests for sustenance. Since these individuals will be more vulnerable to changes in the management of local resources, it is important for forest management to understand how these forest users may be affected by restricting forest uses. Following the Office of Management and Budget's Directive 14, the Census Bureau uses a set of income thresholds that vary by family size and composition to detect who is classified as poor. If the total income of an individual or family falls below the relevant poverty threshold, the individual or family is classified as being below the poverty level.

Overall, 2012 estimates of the share of people and families living under the poverty level were higher in the Nez Perce Reservation than at the national level; in Wallowa County the share of families living under the poverty level was higher than at the national level, as seen in Figure 5 below (U.S. Department of Commerce 2013). Low income coupled with an above-average minority population in the Nez Perce Reservation shows that this community could be vulnerable to changes in the way Forest Service land is managed because they often use WWNF resources for subsistence.

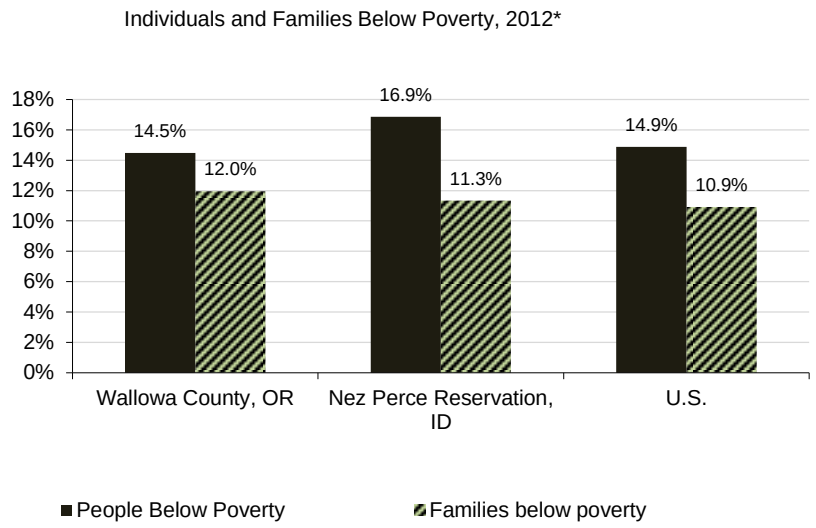

Figure 5. Individuals and families living below the poverty level, 2012 (U.S. Department of Commerce 2013)

Through public meetings, community members and representatives expressed that low-income and juvenile populations are the most vulnerable in the project area. Concurrent with a decline in National Forest timber harvest has been a decline in jobs and a perceived loss in quality and quantity of social services, such as programs for children and education.

ENVIRONMENTAL CONSEQUENCES

The previous sections assessed past and current social and economic conditions. The following section will consider the potential consequences of alternative management scenarios on the social and economic environment in terms of financial efficiency, economic impacts and social impacts from restoration activities.

Commenters raised concerns over the restoration treatments and potential to stimulate local economies, which are outlined in the DEIS. Public and internal scoping identified three significant planning issues that drove the development of the range of alternatives. Of relevance to this report is:

> There is disagreement about the best network of roads that will allow for recreation, harvesting forest products, fire management, accessing private inholdings, administration, and other uses, while also reducing or eliminating the adverse impacts that roads may have on forest and riparian resources.

The effects of the alternatives on this issue will be addressed in more detail below (specifically the financial efficiency and social analysis). In addition, the discussions on impacts to the timber market and ecosystem services (non-market values) provide insight into the socioeconomic benefits and costs received by local communities from the LJCRP activities. The management alternatives are anticipated to stimulate local economies by providing forest products from the treatments and from sustained healthy forests.

Effects Common to all Alternatives

Treatment Costs and Wildfire

Treatment is associated with a decrease in wildfire suppression costs and a decrease in net resource damage (Mercer 2000). Prescribed burning is often preferred to mechanical thinning due to the lower cost of prescribed burning. However, depending on proximity to urban centers, a full accounting of the costs of prescribed burning may reveal that mechanical thinning is more economically efficient in some circumstances. The cost of smoke exposure, for instance, is higher when prescribed burning occurs near population centers. Mechanical treatment also has costs that are not accounted for in the cost of implementation, such as soil erosion. However, the indirect consequences of prescribed burning are more easily observable, which generally make it a less publicly popular treatment option.

Fuel reduction projects can significantly reduce the risk of catastrophic wildfire (WFLC 2010). Assessing the cost-benefit ratio of fuel reduction projects is questionable without information on the degree to which treatment reduces the risk of wildfire. Furthermore, the scale and cost of prevented wildfires is uncertain and widely variable. Anticipated reductions in the threat to human life and decreases in wildland fire related costs such as property loss, lost revenues and suppression costs are not included in the analysis of PNV for the alternatives. Fuels treatments under these alternatives will improve fuel conditions and make the surrounding area more resistant to large scale wildfires. While the PNV of restoration treatments is positive under all alternatives, the prevention of one fire could make the PNV of restoration activities significantly greater.

Timber Market and Forest Products

The viability and economic effects of merchantable timber as a result of the LJCRP are important to consider. The LJCRP would likely increase the amount of timber on the market. In addition, the management alternatives assume high utilization by local processing, which seems likely according to the public meetings. While the market for timber may still be depressed, the current timber processors in the WWNF region seem to have enough product demand and capacity to process the forest products.

As a result of the restoration treatments proposed under all of the alternatives, the long-term provision of forest products will provide the opportunity for stewardship contracting and improved utilization. Populations in the analysis area will be supported by these restoration treatments. Many of the restoration treatments produce commercially-valuable forest products.

	ANNUAL TREATMENT			
COST CATEGORY	**Alt 2**	**Alt 3**	**Price per unit**	**Units**
NON MECHANICAL				
Broadcast Burning (Planned Ignition Natural Fuels)	5,000	5,000	$ 90	acres
Pile Burning (Grapple Piles)	678	464	$ 70	acres
Pile Burning (TSI Hand Piles)	47	40	$ 70	acres
Timber Stand Improvement (Chainsaw) and Hand Pile [25% of TSI pole]	47	40	$ 400	acres
Timber Stand Improvement (Chainsaw) [TSI seed/sap]	356	102	$ 125	acres
Burn landings	1,639	1,006	$ 5	acres
MECHANICAL				
Grapple Pile (Activity Fuels on Tractor Ground)	678	464	$ 175	acres
Timber Stand Improvement (Tractor) [75% of TSIpole]	142	119	$ 200	acres
COMMERCIAL TIMBER HARVEST- REVENUE				
timber harvest	10,400	6,600	$ 23	ccf
COMMERCIAL TIMBER HARVEST- COSTS				
Weed spraying	56	56	$ 300	acres
Sale Preparation	10,400	6,600	$ 20	ccf
Sale Administration	1,639	1,006	$ 20	acres
Site Preparation [20% of GS Acres]	52	18	$ 120	acres
Planting [20% of GS Acres]	52	18	$ 350	acres
Regeneration Surveys	52	18	$ 6	acres
Plantation Survival Exams	52	18	$ 8	acres
ROADS				
Road Construction				
Temporary Road Construction	1.3	1.3	$ 15,000	mile
Specified Road Reconstruction	82.6	82.6	$40-70,000	mile
Active Road Decommissioning	1.5	0.0	$ 3,600	mile
Road Maintenance				
Road Surface Replacement Collections				
Asphalt Surface (8.7 miles)	2,600	1,650	$0.48	ccf/mile
Crushed Aggregate Surface (30.8 miles)	7,800	4,950	$0.47	ccf/mile
Purchaser/Contractor Performed Maintenance				
Operational Maintenance Level 1	10	7	$ 2,190	mile
Operational Maintenance Level 2	16	18	$ 1,721	mile
Operational Maintenance Level 3	4	4	$ 680	mile

Table 1 shows the project area's potential for forest products in terms of maximum expected forest product volumes from treatments proposed under each alternative. These are the maximum annual volumes expected to occur over 10 years, or the life of the restoration project.

In addition, it is important to consider other benefits of harvesting timber on Forest land, such as the effects of removing fuels and improving wildfire mitigation and the potential to create jobs and income in the local economies. The benefits to the timber industry result from the healthy forest, as a result of the LJCRP, which can provide higher quality harvest of wood products. Harvest operations can also foster forest restoration efforts and generate income that can be retained locally to collect seed, prepare sites and plant the trees that will constitute the managed forest. The managed forest as a result of the LJCRP can

provide valuable ecosystem services, such as wildfire mitigation, recreation, water quality, air quality, genetic diversity and wildlife habitat.

Non-Market Values

Under the Affected Environment section above, ecosystem services were mentioned as a value that should be considered in the economic analysis, even though they can be difficult to quantify. Examples of ecosystem services that could be affected by the LJCRP are water quality, air quality, and biodiversity. These are all values that are not traded in markets and are often excluded from quantitative analysis. The non-market effects for each alternative are detailed below but exist under all alternatives.

As a part of ecosystem services, wildland fire is an integral natural process essential to sustaining healthy forest ecosystems. The restoration treatments under all of the alternatives are expected to improve conditions of the forest health. Dense forests with high fuel loads can "threaten neighboring non-federal forests via their overcrowded and hazardous conditions that foster wildfire, pests, disease, and invasives" (AFRC 2014). Trees weakened by pathogens and/or insects may also suffer greater mortality during fire than healthy trees (Parker 2006). The LJCRP treatments are expected to reduce the spread of invasive species, improve biodiversity of plant and animal species, as well as improve the soil composition, water quality, air quality, and provision of aesthetically pleasing recreation opportunities.

Range

None of the alternatives are expected to affect grazing operations in the Lower Joseph Creek area. There are no anticipated changes in AUMs on the allotments due to implementation of the LJCRP. The range AUMs are determined by permitting and LJCRP is not expected to change permitting. As a result, no changes in grazing-related employment and labor income are expected.

Over the long term, improved forest health would improve forage quality and ranching viability. As noted in the Range report, there could be an increase in forage production due to the treatments. About 17 percent of the treated acres in allotments in Alternative 2 would show increased forage production and under Alternative 3, about 10 percent of the treated area in allotments would show increased forage production. Since the improvements to forest health are expected to be the greatest under the Proposed Action alternative, there will likely be the greatest improvement to rangeland under this alternative. Once the restoration treatments have had time to improve the forest health, there may be more land suitable for grazing under all of the alternatives. However, the permitted range would have to change outside of this EIS before the community would see effects to employment and labor income from grazing.

Summary of Effects

Financial efficiency

Financial efficiency analysis measures the ratio of economic benefits to economic costs resulting from activities under the LJCRP. Forest restoration projects are designed primarily to meet non-commodity objectives, making it difficult to monetize project benefits as to fit within the net present value framework. Although forest restoration is anticipated to lead to positive outcomes, not all benefits realized through restoration treatments under the LJCRP can be monetized due to data limitations and

uncertainty. Therefore, the following discussion of financial efficiency is primarily descriptive in its analysis of tradeoffs.

Table 5 summarizes the Present Net Value (PNV) of timber harvest and restoration treatments from the Forest Service perspective and includes all costs and benefits (revenue) associated with these activities (that are not already included in the stumpage rate - see Methodology section for more details). A 4 percent discount rate was used over a period of 10 years (2014–2023), the estimated time required for full implementation of the project. Over the 10-year treatment period, the LJCRP is expected to cost the Forest Service between approximately $6.4 and $7.9 million. This is the discounted cost to the government of the project. The anticipated revenue from the timber harvest (benefits) is expected to range from approximately $1.2 to $1.9 million. Therefore, the negative PNVs are -$5.9 million for the Proposed Action and -$5.1 million for Alternative 3.

	No Action Alternative	Proposed Action	Alternative 3
PV Costs	$0	$7,857,110	$6,390,190
PV Revenue	$0	$1,940,126	$1,231,234
Present Net Value	$0	$(5,916,984)	$(5,158,956)

Table 5. Present Net Value of LJCRP Treatments over 10-year Period, 4 Percent Discount Rate

Treatments proposed under the LJCRP are intended to restore the structure and function of the forest and watersheds in the analysis area. Benefits of these treatments include reduced fire hazard, increased ecosystem services and wood product removal, but these are not included in the values in Table 5.

Economic Impacts

Assuming treatments within the LJCRP are implemented over 10 years, annual employment from implementing the Proposed Action is estimated to be 55 jobs, amounting to $2.9 million in labor income annually within Wallowa and Union counties during that period. Those jobs include direct jobs supported from direct implementation of work and processing of material as well as jobs supported by the indirect and induced effects of that work. Implementation of Alternative 3 is estimated to result in 34 jobs and $1.9 million in labor income annually in the two counties over the 10-year period. For the Proposed Action and Alternative 3, about 36 percent of the projected jobs are projected to be in the Manufacturing sector, which would include local timber processing facilities. Further, the Agriculture sector of the economy (which includes businesses completing forest management activities) is projected to account for about 28 percent of projected jobs, in both cases.

Category	No Action Alternative	Proposed Action	Alternative 3
Employment (Full- and part-time jobs)			
Restoration generating commercial products	0	50	31
Restoration not generating commercial products	0	2	1
Road work	0	3	3
TOTAL	0	55	34
Labor Income (thousands of 2012 dollars)			
Restoration generating commercial products	$0	$2,802	$1,778
Restoration not generating commercial products	$0	$56	$39
Road work	$0	$107	$88
TOTAL	$0	$2,965	$1,905

Table 6. Summary of economic impacts.

This analysis does not count any additional potential jobs or income created within the Forest Service to plan for or implement the LJCRP. Additionally, there may be other jobs beyond those reported here that result from other restoration activities like fence line repair.

We assume that a share of the restoration activities not generating commercial products (e.g., hand thinning of pre-commercial stands, planting) is completed by contractors located outside the economic impact area. Although the contract value for those projects will leave the economic impact area, there may be some spending by those out-of-area contractors within the economic impact area while they are completing restoration projects. Any economic activity resulting from the spending of out-of-area contractors in Wallowa and Union counties would be in addition to the economic effects reported here.

Local logging contractors believe the commercial timber harvest in the Proposed alternative and Alternative 3 of the LJCRP could be completed in 5 years rather than 10 years. Assuming all harvesting and processing is completed over 5 years, the commercial timber harvest restoration activities in the Proposed Action of the LJCRP are estimated to support 100 jobs and $5.6 million in labor income annually over 5 years. For Alternative 3, if the commercial timber harvest restoration activities and processing were completed over 5 years, 62 jobs and $3.4 million in labor income is projected to be supported annually over the 5 years. In both cases, the number of jobs and labor income supported will be less than what is projected if local timber processors cannot handle the volume of material generated during the 5 years and more of it leaves the local area for processing.

Social Impacts

In addition to effects on the local economy, activities under the LJCRP have the potential to affect the livelihood, cultural values, and biological values of people in the analysis area. The social consequences are measured qualitatively, with a particular focus on access, recreation uses, environmental justice and non-market values.

The Proposed Action alternative, which proposes to decommission 23 miles of roads and close an additional 15 miles, has more of an effect to access than Alternative 3, which proposes no new closures or decommissioning. However, the positive effects to recreation uses for fishing, gathering special forest products, and hunting are greater in the long term under the Proposed Action Alternative since there will be more restoration treatments to improve habitat and a corresponding lower risk of wildfire. However,

under the No Action alternative and Alternative 3, recreation effects could be greater as the risk of fire is expected to be greater without any or less restoration treatment.

While minority and low-income populations exist in the area, the alternatives are not expected to have disproportionately high and adverse human health or environmental effects on these communities. The effects to minority populations in the analysis area are borne mostly by tribes and are addressed in the Tribal report. Low income populations in the LJCRP analysis area could be affected by the access to recreation opportunities and resource use. If the low-income populations have to travel greater distances to access recreation, they could incur extra costs since it is more expensive to reach the forest in indirect ways as access decreases. However, decommissioning up to 23 miles and closing up to 15 miles of roads is not expected to have significant and disproportionate effects on these communities.

The existence of non-market values likely underestimates the benefits of the LJCRP. Over time, forest restoration treatments would decrease fuel load and decrease potential smoke emissions from both planned and unplanned ignitions. The proposed activities would protect ecosystem services and other social values, such as recreation opportunities and subsistence uses. Overall, the Proposed Action is expected to improve non-market values to the greatest extent in the long term.

Alternative 1 - No Action

Alternative 1 is the No Action alternative. The Lower Joseph Creek Restoration Project would not be implemented under Alternative 1. No management actions, other than fire suppression, would be taken that would actively and directly modify the landscape's trajectory away from the historic range of variation.

Direct and Indirect Effects – No Action

Financial Efficiency and Economic Impacts

No direct effects on the local economy would occur under the No Action alternative. Within the analysis area, economic conditions and trends (employment, labor income, unemployment, etc.) would not change relative to the LJCRP since no action would be taken. In addition, any potential revenue from the sale of timber would not be realized under the No Action alternative. Indirect effects on local economic conditions could occur as a result of the No Action alternative, however, estimates of these changes are not available. The lack of measurable direct and indirect effects translates to a lack of measurable cumulative effects to economic conditions under the No Action alternative.

As discussed above, greater non-prescribed wildland fire related costs could result if fuels are left untreated under the No Action alternative. Potential threats and costs to human life, property and fire-fighter safety under the No Action alternative would be greater than the Proposed Action and Alternative 3. Fire suppression costs and risk to life and property should be less when wildland fires occur where hazardous fuels have been treated compared to areas where fuels have not been treated. This is commonly accepted since fires in non-treated areas generally burn hotter, flame length is higher, and fires in tree canopies are more likely. However, it is not possible to predict the level and costs of non-prescribed wildland fire under the No Action alternative.

Social Impacts

Under the No Action alternative, social impacts to livelihood, cultural values, and biological values will not change from the present. However, with a greater risk of wildland fire and unchanged conditions for forest health under the No Action alternative, the possibility of long-term effects to recreation may be greater under this alternative.

Timber Market and Forest Products

The No Action alternative would not provide new timber for harvest and therefore is not anticipated to affect the timber market relative to the current condition. However, if the incidence of wildfire increases as a result of not completing restoration treatments, large fires could damage existing forest stocks and increase the amount of salvaged wood on the market, leading to decreases in delivered log prices.

Non-Market Values

Under the No Action alternative, the impacts to ecosystem services may be more severe. For example, water quality enhancement in the long term may be minimal compared to the other alternatives. Without restoration treatments, the forest health could continue to decline along with the ecosystem services it provides (such as air quality, water quality, and biodiversity). Although these services are difficult to quantify, they should be considered.

Environmental Justice

As indicated in the Affected Environment section above, minority and low-income populations exist in the analysis area. While the No Action alternative is not expected to have a disproportionately high and adverse human health or environmental effects on these communities, increased susceptibility to wildfire could result. Consequently, additional unmeasurable indirect economic effects associated with increases in wildland fire-related costs are possible, which could result in impacts to local communities. However, there is no reason to suspect that any impacts will disproportionately affect minority and low income populations.

Alternative 2 - Proposed Action

Under the Proposed Action alternative, there would likely be thinning and mechanical fuel treatments across approximately 15,925 acres and thinning of largely younger trees across an additional 5,453 acres over the 10-year span of the LJCRP. No treatments would occur in categories 1, 2 or 3 riparian habitat conservation areas (RHCA), with the exception of Swamp Creek (Category 1 RHCA), or any RHCAs that are currently in an old forest structural condition. Silviculture treatments in category 4 RHCAs (intermittent, non-fish bearing streams) would only be applied where they support attainment of RMOs, and would generally parallel adjacent upland treatments. No trees greater than 21 inches in diameter would be harvested in Management Area (MA) 15. Prescribed burning would occur using planned and unplanned ignitions of natural fuels on up to 90,000 acres based on needs to restore forest resilience. Activities under this alternative, such as timber harvest and restoration, will have economic consequences depicted below. The existing economic conditions related to timber harvest and restoration are depicted above (for example, **Error! Reference source not found.** depicts employment and specialization in logging and wood products manufacturing).

Direct and Indirect Effects – Proposed Action

Financial efficiency

Table 7 summarizes the financial efficiency for the Proposed Action alternative. The PNV indicates the financial efficiency of the timber sale and restoration activities, including all costs (that are not included in the stumpage rate) and revenues associated with the activities and required design criteria (information obtained from Timber specialist assigned to the project). As seen in

	ANNUAL TREATMENT			
COST CATEGORY	**Alt 2**	**Alt 3**	**Price per unit**	**Units**
NON MECHANICAL				
Broadcast Burning (Planned Ignition Natural Fuels)	5,000	5,000	$ 90	acres
Pile Burning (Grapple Piles)	678	464	$ 70	acres
Pile Burning (TSI Hand Piles)	47	40	$ 70	acres
Timber Stand Improvement (Chainsaw) and Hand Pile [25% of TSI pole]	47	40	$ 400	acres
Timber Stand Improvement (Chainsaw) [TSI seed/sap]	356	102	$ 125	acres
Burn landings	1,639	1,006	$ 5	acres
MECHANICAL				
Grapple Pile (Activity Fuels on Tractor Ground)	678	464	$ 175	acres
Timber Stand Improvement (Tractor) [75% of TSIpole]	142	119	$ 200	acres
COMMERCIAL TIMBER HARVEST- REVENUE				
timber harvest	10,400	6,600	$ 23	ccf
COMMERCIAL TIMBER HARVEST- COSTS				
Weed spraying	56	56	$ 300	acres
Sale Preparation	10,400	6,600	$ 20	ccf
Sale Administration	1,639	1,006	$ 20	acres
Site Preparation [20% of GS Acres]	52	18	$ 120	acres
Planting [20% of GS Acres]	52	18	$ 350	acres
Regeneration Surveys	52	18	$ 6	acres
Plantation Survival Exams	52	18	$ 8	acres
ROADS				
Road Construction				
Temporary Road Construction	1.3	1.3	$ 15,000	mile
Specified Road Reconstruction	82.6	82.6	$40-70,000	mile
Active Road Decommissioning	1.5	0.0	$ 3,600	mile
Road Maintenance				
Road Surface Replacement Collections				
Asphalt Surface (8.7 miles)	2,600	1,650	$0.48	ccf/mile
Crushed Aggregate Surface (30.8 miles)	7,800	4,950	$0.47	ccf/mile
Purchaser/Contractor Performed Maintenance				
Operational Maintenance Level 1	10	7	$ 2,190	mile
Operational Maintenance Level 2	16	18	$ 1,721	mile
Operational Maintenance Level 3	4	4	$ 680	mile

Table 1, restoration activities examined under this alternative include (among others) resiliency treatments, prescribed fire, and planting. A 4 percent discount rate was used over a period of 10 years (2014–2023), the estimated time required for full implementation of the project.

Table 7 indicates that the Proposed alternative is not financially efficient for the timber harvest and required design criteria, as well as for all restoration activities noted above, as indicated by the negative PNV, -$5.9 million. This addresses the concern of community members that indicated it is important to have product pay for the project and be financially efficient. However, since the PNV does not include non-market values, such as ecosystem services as discussed above, the benefits are likely an underestimate. The estimated costs of treatment are the highest under the Proposed Action alternative since the restoration treatments are the most intensive. Therefore, the expected non-market values derived from the Proposed Action will likely be greater than Alternatives 3 and the No Action alternative.

Indirect effects on financial efficiency could occur as a result of the Proposed Action alternative, however, estimates of these changes are not available. It is anticipated that fuels treatments under this alternative would contribute to fuels conditions that would have more resistance to wildland fire. This would tend to decrease wildland fire related costs such as property loss, lost revenues and suppression costs.

Proposed Action Alternative	**Present Value of Benefits**	**Present Value of Costs**
BENEFITS		
Revenue from commercial timber volume	$1,940,126	
COSTS		
Non-Mechanical		$4,576,354
Mechanical		$1,192,525
Commercial timber harvest		$2,088,231
Sum of discounted benefits and costs	$1,940,126	$7,857,110
Present Net Value	$(5,916,984)	

Table 7. Present Net Value for the Proposed Action Alternative.

Economic Impacts

The Proposed alternative results in restoration activities with commercial timber production of 10,400 ccf per year for 10 years; mechanical, pre-commercial, stand treatment on 820 acres per year; 404 acres of restoration treatment by hand labor; and a variety of road projects. Implementation of the Proposed alternative is projected to support 55 jobs and $2.9 million in labor income in Wallowa and Union counties annually over 10 years. Those impacts in the local area include the jobs supported directly by completion of restoration treatments and processing of the commercial timber and the indirect and induced jobs related to those activities.

The implementation of the LJCRP would yield employment changes in many economic sectors within Wallowa and Union counties. The greatest number of jobs supported would accrue to the Manufacturing and Agriculture and Forestry sectors. Other sectors affected by the LJCRP include Retail Trade, Construction, Professional Services, and Health Care.

Industrial sector	**Jobs supported**
Manufacturing	19
Agriculture and forestry	16
Professional, scientific, and technical services	2
Retail trade	2

Health care and social assistance	2
Accommodations and food services	2
Construction	2
Other industrial sectors (8)	10
Total	55

Table 8. Projected employment by major industry for the proposed alternative.

Social Impacts

In addition to effects on the local economy, activities under the LJCRP have the potential to affect the livelihood, cultural values, and biological values of people in the analysis area. The social consequences are measured qualitatively, with a particular focus on access, recreation uses, environmental justice and non-market values.

Livelihood

The jobs and income, as detailed above under the economic impacts section, that the Proposed Action alternative are expected to support will likely improve the livelihood of area residents. These jobs and income are expected to be generated over the next ten years, which is the life of the project. The increase in jobs and labor income in the analysis area from the Proposed Action alternative will likely increase the tax base, public services, funding for schools, capital maintenance projects, and reduce poverty. Since the increase in jobs and income is greater under the Proposed Action alternative, the expected increase in the public services will be greater than under the other alternatives.

The tax rates on timber harvested during 2014 under the Forest Products Harvest Tax (FPHT) is $3.53 per thousand board feet (MBF). The receipts from this tax program are dedicated to the partial funding of state-run programs that promote forest research, fire prevention and fire suppression, forest practices act administration, and improve public understanding of Oregon's forest resources (State of Oregon 2014). However, the funding for schools and other public services are more likely to come from personal income taxes (from 5 to 9.9 percent of taxable income) and property taxes. With increases in labor income, as detailed in the economic impacts section above, the state tax base and therefore public services could also increase.

Additionally, with more jobs and income in the area under the Proposed Action alternative, there may be more opportunities for younger generations. In turn, youth may choose to stay in the area and improve the age diversity. With a more balanced age composition, the economy will be more sustainable in the long-term.

Commenters raised the issue of access to public lands. The Proposed Action alternative will decommission 23 miles and close 15 miles of roads over the 10-year span of the project and will therefore have a greater negative impact on access to WWNF land compared to Alternative 3, which proposes no new decommissioning or closing of roads. Since many community members value access to public lands, the Proposed alternative will negatively affect this value. In addition to closure of roads, public access could be impacted by short-term increases in traffic but these effects will be intermittent during restoration. The potential increase in traffic is based on treatments in association with the timber sale. Under the Proposed Action alternative, there are more treated acres, and therefore greater short-term effects to traffic.

Cultural Values

As discussed in the Affected Environment section above, residents in the LJCRP area value the land mostly for recreation uses, such as hunting, fishing, gathering forest products, wildlife viewing and scenery, among others. See the Tribal report for effects to subsistence uses. These recreation uses are also linked to access, as discussed in the previous section. With more roads decommissioned, this limits access to public lands for recreation purposes. Since the Proposed Action decommissions and closes more miles of roads than Alternative 3, the effects to recreation access will be greater under the Proposed Action than the effects under Alternative 3. Under the Proposed Action alternative, there could also be intermittent disruption of access to the LJCRP area for treatments and therefore disturbance during hunting season. This effect is greater under the Proposed Action alternative since there are more acres likely to be treated.

Under the Proposed Action alternative, the positive effects to recreation uses for fishing, gathering special forest products, and hunting are greater in the long term since there will be more restoration treatments and a corresponding lower risk of wildfire. As noted in the Wildlife report, prescribed burning in alternatives 2 and 3 would generally benefit elk habitat through forage enhancement. With improved ecosystem services from restoration, this will likely positively impact fish and wildlife habitat, water and air quality and plant diversity for recreation uses by people in the analysis area. As detailed in the Aquatics report, there is a low likelihood that the proposed timber harvest activities will result in measureable increases in fine sediment in fish bearing streams in the analysis area that would degrade habitat for redband trout. However, since more treatments are proposed under this alternative, effects to recreational fishing are higher than under Alternatives 1 and 3. Alternative 2 may result in a short-term increase in fine sediment resulting from prescribed burning activities. In the long-term, the Proposed Action will improve vegetative conditions and maintain the natural fire regime in the project area which will have beneficial impacts to redband trout and their habitat and provide greater opportunities for recreational fishing. However, under the No Action alternative and Alternative 3, negative recreation effects could be greater as the risk of fire is expected to be greater without any or less restoration treatment. For more information on the effects to the specific resources, see the other specialist reports (Aquatics, Wildlife, and Botany analyses).

Vegetation management is needed to return these landscapes to a more natural appearance and higher scenic quality for recreation. More natural, park-like stands, which are substantially less abundant across the landscape than historically, have little likelihood of returning without mechanical restoration treatments to facilitate the reintroduction of fire. The Proposed Action alternative meets the purpose and need to a much greater extent than the other alternatives.

In the short-term, while prescribed burning treatments take place, smoke could affect the ability to recreate and enjoy the scenery in the Lower Joseph Creek area. With more acres to be treated under the Proposed Action alternative, the short-term impacts are higher than the other alternatives. However, the FS is not planning to burn during peak visitor season so the impacts are expected to be minimal.

Biological Values

Commenters revealed that they value air and water quality, wildlife, and old growth trees, among others. Due to increased restoration under the Proposed Action, improved ecosystem services and decreased risk of wildfire, these biological values will likely be improved in the analysis area. The value for old growth

trees is preserved under all alternatives because there is no old growth harvest proposed. Rather than positively impacting this value (the FS is not increasing the amount of old growth trees), by not harvesting old growth trees, the value is maintaining its integrity in the community. People will benefit from knowing that the trees exist and are continuing to provide biological services to the forest ecosystem. For more information on the effects to the specific biological resources, see the other specialist reports (Aquatics, Wildlife, and Botany analyses).

Timber Market and Forest Products

The Proposed alternative would add timber to the regional supply and is expected to have positive impacts on the current timber market. The timber mills in the area might increase their employment in response to increased supply from the LJCRP. AFRC (2014, Appendix A) estimated that the ten mills in the area are operating at an average of 39 percent capacity and therefore have the capacity to process sawtimber in the Proposed Action. Contacts from the local logging industry believe that the demand for timber products in the region is expected to increase as the products are shipped around the world. Under the Proposed Action, this distance and relevant transportation costs could decline as the industry receives more wood from the LJCRP.

Non-Market Values

Under the Proposed Action alternative, forest health is expected to improve the most compared to the other alternatives. The Proposed Action alternative would also decrease the likelihood of crown fire relative to existing conditions more than the other alternatives. Over time, forest restoration treatments would decrease fuel load and decrease potential smoke emissions from both planned and unplanned ignitions. The proposed activities under this alternative would protect ecosystem services and other social values, such as recreation opportunities and subsistence uses. Therefore, ecosystem functionality is expected to improve and contribute to community members' non-market values the most. For more details on other social values, see the Social Impacts section above.

Environmental Justice

While minority and low-income populations exist in the area, the Proposed Action is not expected to have disproportionately high and adverse human health or environmental effects on these communities. The environmental justice communities expected to be impacted the most are within the Nez Perce tribe. Since this community uses the Lower Joseph area for cultural and religious practices as well as for subsistence uses, they are more vulnerable to changes in the area's natural resources due to the LJCRP. In the long-term, the Proposed Action is expected to improve natural resource conditions. However, in the short-term, the natural resource uses will be affected the most under the Proposed alternative since it involves the greatest amount of treatment. These effects are addressed in greater detail in the Tribal and Heritage report.

The low income populations in the LJCRP analysis area could be affected by the access to recreation opportunities and resource use. Under the Proposed Action alternative, 23 miles of roads will be decommissioned and 15 miles of roads will be closed over the 10 year span of the project, compared to no miles of decommissioned or closed roads under Alternative 3. If the low-income populations have to travel greater distances to access recreation, they could incur extra costs since it is more expensive to

reach the forest in indirect ways. However, decommissioning 23 miles and closing 15 miles of roads is not expected to have significant and disproportionate effects on these communities.

Through public meetings, community members and representatives expressed that they expect the LJCRP to improve current environmental justice conditions, specifically related to low-income and children populations. With increased job opportunities for parents, they will be able to provide better opportunities for their children and the expected increase in the tax base under the Proposed Action alternative will presumably provide more support for schools. An increase in the tax base could also potentially increase social services for low-income populations and help alleviate poverty.

Cumulative Effects

Access: Effects to access to WWNF land was an issue brought up through public comments and meetings. The attitude towards the LJCRP from a subsection of the community is generally negative because, although it may not contain significant access restrictions, the LJCRP is seen as an addition to the previous restrictions put in place and is viewed as a trend towards limiting access to public lands. Travel management planning on the WWNF is on-going and this could change cross-country travel and the existing network of roads on the Forest. If some roads on the WWNF are closed in the future for cross-country travel, commenters expressed that the value of maintained roads would increase. Under the Proposed Action alternative, the cumulative effects on access to FS lands are greater than the effects from Alternative 3 since 23 miles of roads will be decommissioned and 15 miles will be closed.

Treatment and Restoration: The effect of past, present, and reasonably foreseeable treatment activities in the project area would improve forest health relative to existing conditions even without the implementation of LJCRP. According to Table X in the vegetation report, from 2004 to 2013, approximately 1,320 acres have been commercially harvested in the Lower Joseph area. Under the Proposed Action, 15,925 acres are expected to be commercially harvested over the ten year span of the project. Under the Proposed Action alternative, the activity in the forest sector would be higher than the present situation and the associated local economic impact of current and future restoration activities would increase from the present conditions. The estimated employment and income consequences of non-LJCRP treatment activities, therefore, are likely underestimated in the related environmental compliance documents if they depend on present conditions for those analyses.

The LJCRP treatments and other ongoing and foreseeable treatments could increase exposure to smoke emissions, which could cause cumulative effects to health and quality of life for individuals who are sensitive to smoke. According to Table X in the vegetation report, from 2004 to 2013, approximately 592 acres have been broadcast burned and 23,752 acres have incurred wildfire in the Lower Joseph area. Under the Proposed Action, up to 50,000 acres are expected to be broadcast burned over the ten year span of the project. However, the cumulative effect of these treatments would be to decrease the risk of uncharacteristic wildfire, which would decrease the probability of smoke emissions associated with these events.

Recreation: Other on-going and reasonably foreseeable vegetation treatments in the project area will reduce the opportunities for substitute behavior when the preferred recreation site is unavailable. As a result, individuals may choose to stay home, which would decrease visitor spending and consumer surplus to a greater extent than estimated in the direct and indirect effects analysis. However, the

cumulative effects to the social and economic impacts from recreation cannot be precisely described. Based on the available information, the effect to visitor spending and consumer surplus from on-going and reasonably foreseeable actions is not expected to change. Although the Proposed Action alternative will likely have more short-term disturbances to recreation (from smoke and limited access), the long term effects to recreation will be improved viewsheds and opportunities to recreate in a healthy forest with reduced risk of wildfire.

Alternative 3

Under Alternative 3, there would be no treatments in MA15, IRAs, and PWAs. Small diameter thinning could occur in category 1, 2 and 4 RHCAs as per Blue Mountains Project Design Criteria. No trees greater than 21 inches would be harvested, except for safety or administrative reasons. In IRAs, there would also be no non-commercial treatments. Activities under this alternative, such as timber harvest and restoration, will have economic consequences depicted below. The existing economic conditions related to timber harvest and restoration are depicted above (for example **Error! Reference source not found.** depicts employment and specialization in logging and wood products manufacturing).

Direct and Indirect Effects – Alternative 3

Financial efficiency

Table 9 summarizes the financial efficiency for Alternative 3. The PNV indicates the financial efficiency of the timber sale and restoration activities, including all costs (that are not included in the stumpage rate) and revenues associated with the activities and required design criteria (information obtained from Timber specialist assigned to the project). As seen in

	ANNUAL TREATMENT			
COST CATEGORY	**Alt 2**	**Alt 3**	**Price per unit**	**Units**
NON MECHANICAL				
Broadcast Burning (Planned Ignition Natural Fuels)	5,000	5,000	$ 90	acres
Pile Burning (Grapple Piles)	678	464	$ 70	acres
Pile Burning (TSI Hand Piles)	47	40	$ 70	acres
Timber Stand Improvement (Chainsaw) and Hand Pile [25% of TSI pole]	47	40	$ 400	acres
Timber Stand Improvement (Chainsaw) [TSI seed/sap]	356	102	$ 125	acres
Burn landings	1,639	1,006	$ 5	acres
MECHANICAL				
Grapple Pile (Activity Fuels on Tractor Ground)	678	464	$ 175	acres
Timber Stand Improvement (Tractor) [75% of TSIpole]	142	119	$ 200	acres
COMMERCIAL TIMBER HARVEST- REVENUE				
timber harvest	10,400	6,600	$ 23	ccf
COMMERCIAL TIMBER HARVEST- COSTS				
Weed spraying	56	56	$ 300	acres
Sale Preparation	10,400	6,600	$ 20	ccf
Sale Administration	1,639	1,006	$ 20	acres
Site Preparation [20% of GS Acres]	52	18	$ 120	acres
Planting [20% of GS Acres]	52	18	$ 350	acres
Regeneration Surveys	52	18	$ 6	acres
Plantation Survival Exams	52	18	$ 8	acres
ROADS				
Road Construction				
Temporary Road Construction	1.3	1.3	$ 15,000	mile
Specified Road Reconstruction	82.6	82.6	$40-70,000	mile
Active Road Decommissioning	1.5	0.0	$ 3,600	mile
Road Maintenance				
Road Surface Replacement Collections				
Asphalt Surface (8.7 miles)	2,600	1,650	$0.48	ccf/mile
Crushed Aggregate Surface (30.8 miles)	7,800	4,950	$0.47	ccf/mile
Purchaser/Contractor Performed Maintenance				
Operational Maintenance Level 1	10	7	$ 2,190	mile
Operational Maintenance Level 2	16	18	$ 1,721	mile
Operational Maintenance Level 3	4	4	$ 680	mile

Table 1, restoration activities examined under this alternative include (among others) resiliency treatments, prescribed fire, and planting. A 4 percent discount rate was used over a period of 10 years (2014–2023), the estimated time required for full implementation of the project.

Table 9 indicates that Alternative 3 is not financially efficient for the timber harvest and required design criteria, as well as for all restoration activities noted above, as indicated by the negative PNV, -$5.1 million. However, since the PNV does not include non-market values, such as ecosystem services as discussed above, the benefits are likely underestimated. The estimated costs of treatment under Alternative 3 are less than the Proposed Action alternative since the restoration treatments are less intensive. Therefore, the expected non-market values derived from Alternative 3 will likely be less than the Proposed Action alternative greater than the No Action alternative.

Indirect effects on financial efficiency could occur as a result of Alternative 3, however, estimates of these changes are not available. It is anticipated that fuels treatments under this alternative would contribute to fuels conditions that would have more resistance to wildland fire. This would tend to decrease wildland fire related costs such as property loss, lost revenues and suppression costs.

Alternative 3	**Present Value of Benefits**	**Present Value of Costs**
BENEFITS		
Revenue from commercial timber volume	$1,231,234	
COSTS		
Non-Mechanical		$4,168,676
Mechanical		$852,394
Commercial timber harvest		$1,369,119
Sum of discounted benefits and costs	$1,231,234	$6,390,190
Present Net Value	$(5,158,956)	

Table 9. Present Net Value for Alternative 3.

Economic Impacts

Alternative 3 results in restoration activities with commercial timber production of 6,600 ccf per year for 10 years; mechanical, pre-commercial stand treatment on 584 acres per year; 142 acres of restoration treatment by hand labor; and some temporary road construction and road maintenance. Implementation of Alternative 3 is projected to support 34 jobs and $1.9 million in labor income in Wallowa and Union counties annually over 10 years. Those impacts in the local area include the jobs supported directly by completion of restoration treatments and processing of the commercial timber and the indirect and induced jobs related to those activities. The economic effect resulting from restoration activities would be less under Alternative 3 than under the Proposed alternative.

The implementation of the LJCRP would also yield employment changes in many economic sectors within Wallowa and Union counties. The greatest number of jobs supported would accrue to the Manufacturing and Agriculture and Forestry sectors. Other sectors affected by the LJCRP include Retail Trade, Construction, Professional Services, and Health Care.

Industrial sector	**Jobs supported**
Manufacturing	12
Agriculture and forestry	11
Professional, scientific, and technical services	2
Retail trade	2
Health care and social assistance	1
Accommodations and food services	1
Construction	1
Other industrial sectors (8)	4
Total	34

Table 10. Projected employment by major industry for Alternative 3.

Social Impacts

In addition to effects on the local economy, activities under the LJCRP have the potential to affect the livelihood, cultural values, and biological values of people in the analysis area. The social consequences are measured qualitatively, with a particular focus on access, recreation uses, environmental justice and non-market values.

Livelihood

The jobs and income, as detailed above under the economic impacts section, that Alternative 3 are expected to generate will likely improve the livelihood of area residents more than the No Action alternative but less than the Proposed Action. These jobs and income are expected to be generated over the next ten years, the life of the project. The increase in jobs and labor income in the analysis area from Alternative 3 will likely increase the tax base, public services, funding for schools, capital maintenance projects, and reduce poverty. Since the increase in jobs and income is less under Alternative 3 than the Proposed Action, the expected increase in the public services will be less than under the Proposed Action alternative.

The tax rates on timber harvested during 2014 under the Forest Products Harvest Tax (FPHT) is $3.53 per thousand board feet (MBF). The receipts from this tax program are dedicated to the partial funding of state-run programs that promote forest research, fire prevention and fire suppression, forest practices act administration, and improve public understanding of Oregon's forest resources (State of Oregon 2014). However, the funding for schools and other public services are more likely to come from personal income taxes (from 5 to 9.9 percent of taxable income) and property taxes. With increases in labor income, as detailed in the economic impacts section above, the state tax base and therefore public services could also increase.

Additionally, with more jobs and income in the area under Alternative 3 relative to the No Action alternative, there likely will be more opportunities for younger generations. In turn, youth may choose to stay in the area and improve the age diversity. With a more balanced age composition, the economy will be more sustainable in the long-term.

Alternative 3 will not close or decommission any roads over the 10-year span of the project and will therefore have no impact on access to WWNF public lands compared to the other alternatives. Many community members value access to public lands, but Alternative 3 will not affect this value. Public access could be impacted by short-term increases in traffic but these effects will be intermittent during restoration. The potential increase in traffic is based on treatments in association with the timber sale. Under Alternative 3, there are less treated acres than the Proposed Action alternative, and therefore less short-term effects to traffic.

Cultural Values

As discussed in the Affected Environment section above, residents in the LJCRP area value the land mostly for recreation uses, such as hunting, fishing, gathering forest products, wildlife viewing and scenery, among others. See the Tribal report for effects to subsistence uses. These recreation uses are also linked to access, as discussed in the previous section. With more roads decommissioned, this limits access to public lands for recreation purposes. Since Alternative 3 has no new decommissioned or closed roads,

there will be no change of effects relative to the existing condition, therefore the effects will be less than effects to access under the Proposed Action. However, under Alternative 3, there could be intermittent disruption of access to the LJCRP area for treatments and therefore disturbance during hunting season. This effect is lower under Alternative 3 than the Proposed Action since there are fewer acres likely to be treated than the Proposed alternative.

Under Alternative 3, there could be greater detrimental effects to recreation uses for fishing, gathering special forest products, and hunting in the long term than the Proposed Action since there will be less restoration treatments and a corresponding higher risk of wildfire. As noted in the Wildlife report, prescribed burning in alternatives 2 and 3 would generally benefit elk habitat through forage enhancement. With fewer improvements to ecosystem services from restoration, this will likely have greater impacts on fish and wildlife habitat, water and air quality and plant diversity for recreation uses by people in the analysis area. Effects to the fine sediment aquatic habitat and water temperature under Alternative 3 would be less compared to Alternative 2 because of a reduction in commercial thinning acres, burning activities, road reconstruction, and temporary road construction. Therefore, effects to recreational fishing are lower under Alternative 3 since the activities proposed are unlikely to result in degradation of habitat for redband trout. Under the No Action alternative and Alternative 3, negative recreation effects could be greater as the risk of fire is expected to be greater without any or less restoration treatment. For more information on the effects to the specific resources, see the other specialist reports (Aquatics, Wildlife, and Botany analyses).

Vegetation management is needed to return these landscapes to a more natural appearance and higher scenic quality for recreation. More natural, park-like stands, which are substantially less abundant across the landscape than historically, have little likelihood of returning without mechanical restoration treatments to facilitate the reintroduction of fire. Alternative 3 meets the purpose and need to a much lesser extent than the Proposed Action alternative.

In the short-term, while prescribed burning treatments take place, smoke could affect the ability to recreate and enjoy the scenery in the Lower Joseph Creek area. With fewer acres to be treated under Alternative 3, the short-term impacts are less than the Proposed alternative. However, the FS is not planning to burn during peak visitor season so the impacts are expected to be minimal.

Biological Values

Commenters revealed that they value air and water quality, wildlife, and old growth trees, among others. Due to restoration under Alternative 3, improvements to ecosystem services and decreased risk of wildfire are less than under the Proposed alternative. These biological values will likely be improved more than under the No Action alternative but less than under the Proposed Action in the long term with less restoration treatments. However, the value for old growth trees is preserved under all alternatives because there is no old growth harvest. Rather than positively impacting this value (the FS is not increasing the amount of old growth trees), by not harvesting old growth trees, the value is maintaining its integrity in the community. People will benefit from knowing that the trees exist and are continuing to provide biological services to the forest ecosystem. These non-market values are not included in the quantitative analysis yet have a strong hold in the local communities. For more information on the effects to the specific biological resources, see the other specialist reports (Aquatics, Wildlife, and Botany analyses).

Timber Market and Forest Products

Alternative 3 would add timber to the regional supply and is expected to have positive impacts on the current timber market, though less than the Proposed Action. The timber mills in the area could increase their production within their current mill capacities. AFRC (2014, Appendix A) estimated that the ten mills in the area are operating at an average of 39 percent capacity.

Contacts from the local logging industry believe that the demand for timber products in the region is expected to increase as the products are shipped around the world. Under Alternative 3, this distance and relevant transportation costs could decline as the industry receives more wood from the LJCRP.

Non-Market Values

Under Alternative 3, forest health is expected to improve more than the No Action alternative but less than the Proposed Action. Alternative 3 would decrease the likelihood of crown fire relative to existing conditions more than the No Action alternative but less than the Proposed Action. Over time, forest restoration treatments would decrease fuel load and decrease potential smoke emissions from both planned and unplanned ignitions. The proposed activities under this alternative would protect ecosystem services and other social values, such as recreation opportunities and subsistence uses. Therefore, ecosystem functionality is expected to improve and contribute to community members' non-market values more than the No Action alternative but less than the Proposed Action. For more details on other social values, see the Social Impacts section above.

Environmental Justice

While minority and low-income populations exist in the area, Alternative 3 is not expected to have disproportionately high and adverse human health or environmental effects on these communities. The environmental justice communities expected to be impacted the most are within the Nez Perce tribe. Since this community uses the Lower Joseph area for cultural and religious practices as well as for subsistence uses, they are more vulnerable to changes in the area's natural resources due to the LJCRP. In the long-term, Alternative 3 is expected to improve natural resource conditions less than the Proposed Action. However, in the short-term, the natural resource uses will be affected less under Alternative 3 than the Proposed Action since it involves less treatment. These effects are addressed in the Tribal and Heritage report.

The low income populations in the LJCRP analysis area could be affected by the access to recreation opportunities and resource use. Under Alternative 3, no roads will be decommissioned or closed over the 10 year span of the project, compared to the 23 miles of decommissioned and 15 miles of closed roads under the Proposed Action. If the low-income populations have to travel greater distances to access recreation, they could incur extra costs since it is more expensive to reach the forest in indirect ways as access decreases. However, since no roads will be decommissioned or closed under this alternative there are no significant and disproportionate effects on these communities.

Through public meetings, community members and representatives expressed that they expect the LJCRP to improve current environmental justice conditions, specifically related to low-income and children populations. With increased job opportunities for parents, they will be able to provide better opportunities for their children and the expected increase in the tax base under the proposed action alternative will

presumably provide more support for schools. An increase in the tax base could also potentially increase social services for low-income populations and help alleviate poverty.

Cumulative Effects

Access: Effects to access to WWNF land was an issue brought up through public comments and meetings. The attitude towards the LJCRP from a subsection of the community is generally negative because, although it may not contain significant access restrictions, the LJCRP is seen as an addition to the previous restrictions put in place and is viewed as a trend towards limiting access to public lands. Travel management planning on the WWNF is on-going and this could change cross-country travel and the existing network of roads on the Forest. If some roads on the WWNF are closed in the future for cross-country travel, commenters expressed that the value of maintained roads would increase. Under Alternative 3, the cumulative effects on access to FS lands are less than the effects from the Proposed Action since there are no new closures or decommissioned roads.

Treatment and Restoration: The effect of past, present, and reasonably foreseeable treatment activities in the project area would improve forest health relative to existing conditions even without the implementation of LJCRP. According to Table X in the vegetation report, from 2004 to 2013, approximately 1,320 acres have been commercially harvested in the Lower Joseph area. Under Alternative 3, 9,880 acres are expected to be commercially harvested over the ten year span of the project. Under Alternative 3, the activity in the forest sector would be higher than present and the associated local economic impact of current and future restoration activities would increase from the present conditions. The estimated employment and income consequences of non-LJCRP treatment activities, therefore, are likely underestimated in the related environmental compliance documents if they depend on present conditions for those analyses.

The LJCRP treatments and other ongoing and foreseeable treatments could increase exposure to smoke emissions, which could cause cumulative effects to health and quality of life for individuals who are sensitive to smoke. According to Table X in the vegetation report, from 2004 to 2013, approximately 592 acres have been broadcast burned and 23,752 acres have incurred wildfire in the Lower Joseph area. Under Alternative 3, up to 50,000 acres are expected to be broadcast burned over the ten year span of the project. However, the cumulative effect of these treatments would be to decrease the risk of uncharacteristic wildfire, which would decrease the probability of smoke emissions associated with these events.

Recreation: Other on-going and reasonably foreseeable vegetation treatments in the project area will reduce the opportunities for substitute behavior when the preferred recreation site is unavailable. As a result, individuals may choose to stay home, which would decrease visitor spending and consumer surplus to a greater extent than estimated in the direct and indirect effects analysis. However, the cumulative effects to the social and economic impacts from recreation cannot be precisely described. Based on the available information, the effect to visitor spending and consumer surplus from on-going and reasonably foreseeable actions is not expected to change. Although Alternative 3 will likely have less short-term disturbances to recreation (from smoke and limited access) than the Proposed Action, the long term effects to recreation will be also be less improved viewsheds and opportunities to recreate in a healthy forest with reduced risk of wildfire.

CONSISTENCY WITH FOREST PLAN

As described in the most recent Forest Plan, "the indicators used to evaluate the effects of Forest management on the local economy are jobs, personal income and payments to counties" (WWNF Forest Plan 1990 page 3-3). These indicators were used for the economic impact analysis, as detailed above.

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